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Abstract

ABSTRACT

Malaysia History Makers – *MhM* is an educational software regarding prominent people (Royalty, Prime Ministers, Political Makers, Business Makers, Military Makers, Entertainment Makers and Sports Makers) in Malaysia. It is a stand-alone tools that contains interactive biographies via multimedia elements.

The main goal of *MhM* development is to provide an educational software that give benefits to all the users specifically on history education in interactive ways of learning. The contents are accurate and comprehensive based on authoritative resources on the selected Malaysian historical figures.

The development methodology used was waterfall model. The waterfall model methodology has a clear step-by-step phase where the phase is required to be completed almost flawlessly before proceeding to the next phase besides have greater chances of project delivery on time and within budget.

Macromedia Director 8 has been chosen in order to produce a high quality software. With the combination of multimedia development tools such as Adobe Photoshop 7.0 and Macromedia Flash 5.0 the software come out as an interactive learning tool.

Acknowledgement

ACKNOWLEDGEMENT

First of all, I would like to express my sincere appreciation and gratitude to my project supervisor, Mrs. Abrizah Abdullah. Under her supervision, valuable advices given had indeed helped me a lot in my writing and developing the proposed Malaysia History Makers-*MhM* software. Without her valuable guidance given, it is definitely hard in producing such a complete proposal and to accomplish the task in writing this software proposal.

A high appreciation goes to Mrs. Raja Jamilah Raja Yusof, the project moderator for this project. Her support in developing this software had eventually helps in strengthen the will and confidence in producing a better quality of proposed *MhM* software.

Helpful and supportive course mates had given me the greatest encouragement in preparing the proposed software. I would like to thank them in being such a supportive friends by given me advices that led to many improvements in this proposal. Not forgetting my own family especially my parents who supported me in many ways.

It is impossible to list here all those people who helped to sustain me during the proposal development and report, and I apologize in advance for any omissions.

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Table of Contents

TABLE OF CONTENTS

CHAPTER 2: LITERATURE REVIEW

CHAPTER 3: METHODOLOGY

CHAPTER 6: TESTING

CHAPTER 7: SYSTEM EVALUATION

List of Tables

LIST OF TABLES

List of Figures

LIST OF FIGURES

CHAPTER 4: SYSTEM DESIGN

CHAPTER 5: SYSTEM IMPLEMENTATION

CHAPTER 6: TESTING

CHAPTER 7: SYSTEM EVALUATION

Chapter 1

Introduction

CHAPTER 1: INTRODUCTION

1.1 Project background

Malaysia History Makers has been foreseen as educational software on prominent Malaysian from the past and present. Bliss (1999) defines educational software as a type of software that being developed in order to fulfill modern and interactive educational needs that help students, teachers, and also academic interests learn something in a way more interactive, fun besides applying interesting methods.

Those important people (leading Malaysians) are among Royals, Prime Ministers, Political Makers, Business Makers, Military Makers, Entertainment Makers and Sports Makers. Those who are listed as history maker in this software, are from the year of 1957 until today. One main reason the history makers were selected from 1957 onwards because 1957 is the year of Malaysia's independence, perhaps there was more information and selection on local history makers was documented and also can be retrieved.

They may browse the entries via a very user-friendly interface. *Mlim* software was developed to be an interactive educational software. So that, it also provides games and quizzes in order to support learning besides enhance user understandability.

1.2 Project Benefits

The benefits of the projects are indicated below:

a) By adapting this software, the information regarding Malaysia History Makers can be studied through the use of the historical resources and they can be represented by the use of interactive multimedia application. Furthermore, a photograph and biographical profile will be enclosed for each history makers. Users are able to learn more about local history makers in more interesting and interactive ways besides searching for books and articles in library or archives (common manual method).

b) Malaysia History Makers Software can be an importance to education in Malaysia besides contributes to Malaysia's history resources. Furthermore, by the development of the software, it will undeniably enhance our country history resources that can be very useful for future needs and references. Outsiders also can easily learn more about part of our country's history specifically about how the history makers contribute their acknowledged efforts to the country's development. Besides, the software will have the capabilities to facilitate secondary school student needs on their history project as well as accomplished the electronic library for school under smart school program.

c) The project had its own value on historical contents; therefore it could enhance the local content in electronic preservation.

d) The project also explores the opportunity to expose us for developing software package by using multimedia technology and the various tools that are needed to fulfill the whole projects requirements.

e) Provide a cost-effective learning as a CD-ROM would cost relatively less than a book besides improve the features of computer software available (specifically in local market) by providing a learning package that reaches to people with different learning styles and skill levels.

1.3 Project Objectives

The projects aim is to develop software that gives benefits to all the users specifically on history education in interactive ways of learning. There are several objectives to be accomplish in achieving this project goals:

a) To design and develop interactive educational software that contains information on Malaysian prominent historical figures.

b) To design an interactive graphical user interface with the basic structure of the graphical user interface (GUI).

c) To develop an efficient browsing features that will bring capabilities in order to retrieve needed information

d) To create accurate, comprehensive contents based on authoritative resources on the selected Malaysian historical figures.

1.4 Problem Statements

Defining the problem domain is essential in any research and development, especially in the early stage. The problems identified determined the focus of the research and how it will be conducted. The following problems identified in this project contribute to the development of the software.

Traditional teaching of history disregards the use of historical sources. On the other hand, the use of not clear and consequently not comprehendible historical terms limits the ability for the students to understand the real nature of the historical knowledge and leads them to form an unscientific perception of what history is (Grigoriadou *et al*,1999).

The scarcity of materials on local history information regarding local history makers leads to the developments of this software. Whether in printed or electronic version, the information needed can be rarely found. By the software existence, unconditionally will explained the terms 'Who is Who in Malaysia'. The term elaborates the importance and contribution to the country.

The project purpose to provide variety of electronic format on historical sources will contributes to the success on electronic library for school. Based on KBSM (Kurikulum Bersepadu Sekolah Menengah) compulsory needs, students who are sitting for PMR (Penilaian Menengah Rendah) are required to provide a history project called Local History Research. Therefore, this software are such a big advantage for them.

1.5 Project Scope

Jeffrey, Kevin (2000) indicated that scope defines boundaries, of a project, includes the expectation of a project. To be more specific, in this case, what part of the software is to be studied, analyzed designed, constructed, implemented and ultimately improved.

a) Users

The software openly use for general (public) that includes all kind of ages, backgrounds, etc. Basically, the users are the educational community specifically who needs information on local history makers.

b) Information

The contents of information in this software includes history on local contents only. Besides, the contents just based on historians (history makers) that are people. This contents narrowed the scope of this project. Time space are given in order to keep the contents within limit. The software information contents merely within the year of 1957 until now. The history makers before 1957 (the year of Malaysia's Independence Day) will not be included in the entries.

c) Search option

The software gives option to the users to browse the entries. Users may browse by name, categories of the history makers or time (year) for entries needed.

d) Functional requirements

It also has the capabilities to print the documents. Interactive quizzes besides photo and audio elements are provided as part of functional requirements.

e) Language

The Malaysia History makers Software use English language as the language application as the Malaysian government encourages the use of English language specifically on education. Furthermore, indirectly able to make students became familiar in English Language usage and from an early age. So that, when they reached for higher education, they won't face much difficulty especially when dealing with reference books that are mostly in English Language.

1.6 Hardware and Software Requirements

Project requirements are every tools, hardware, software and aids required to develop a software package in all its project development stages (Mandanis, 2000). In this project, the requirements are:

A personal computer with the following software installed:-

a) Macromedia Flash MX

b) Paint and Adobe Photoshop 6.0 (creating and editing graphics)

c) Adobe Image Ready

d) Sonic Foundry SoundForge 6.0 (audio editing)

e) QuickTime 4.0 (video editing)

Other hardware requirements:-

a) A compatible personal computer with at least Pentium 200MHz processor

b) At least 64 MB RAM, with at least 110 hard disk space

c) 16 bit sound card

d) Speaker

e) Microphone

f) Printer

g) Scanner

1.7 Project Schedule

In order to achieve the project objectives, a project schedule is planned to manage the time taken for each task. The schedule has been divided into 7 stages; Project Proposal, System Study, Requirements Analysis, System Design, System Development, Evaluation and System Testing and also the documentation.

Figure 1.1 presents the project schedule for the development of Malaysia History Makers-*MhM* software.

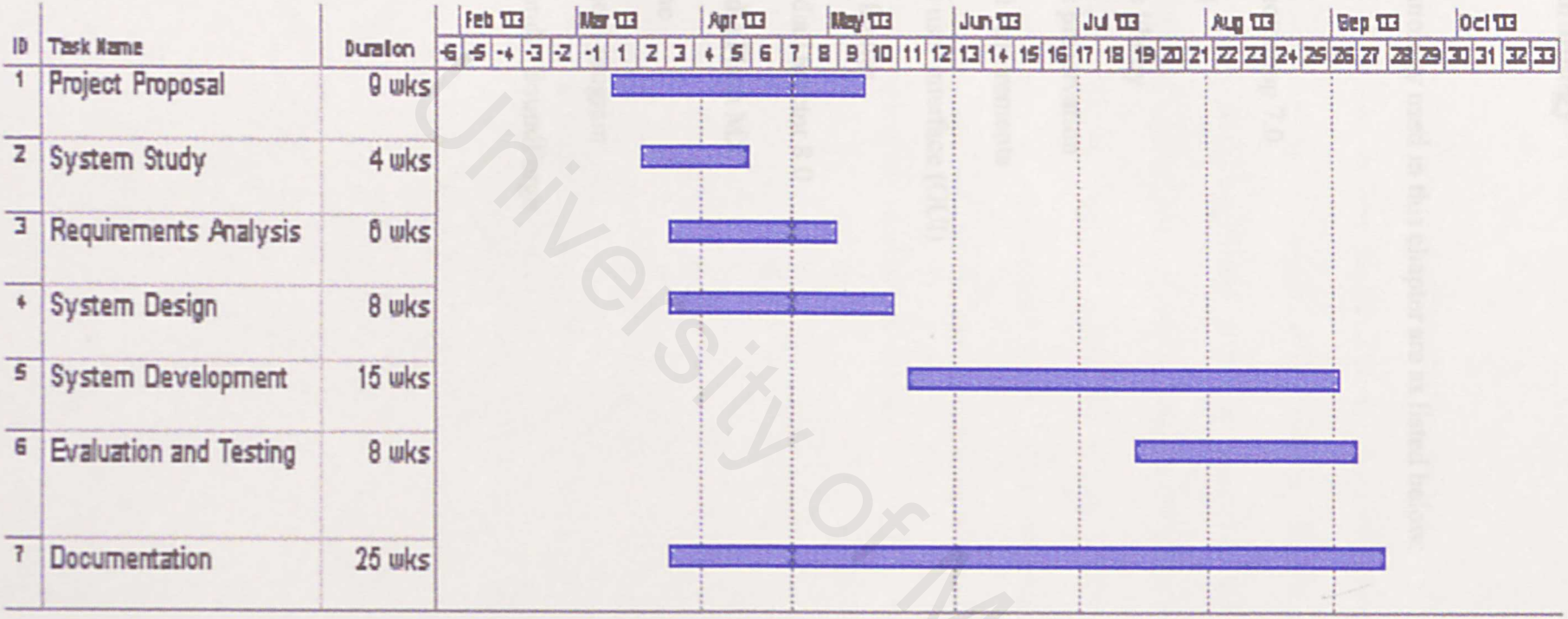


Figure 1.1: The Project Schedule for the Development of Malaysia History Makers

1.8 Terminology

The terminology used in this chapter are as listed below:

Adobe Photoshop 7.0

CD-ROM

electronic library

electronic preservation

functional requirements

Graphical user interface (GUI)

historical figures

Macromedia Director 8.0

Macromedia Flash MX

QuickTime

Smart school program

Sonic Foundry SoundForge

1.9 Chapter 1 Summary

Chapter 1 briefs on the fundamental understanding of this project. It explains the background of the study. The Malaysia History Makers software are much needed and in great demand with the fast transition of mankind into the cyber world of bits. The Malaysia History Makers software is like an answer to the government's visions for locally developed educational software to cater for the smart school programme.

The project purposes are delineated in this chapter. It further indicates the problem statements and the project scope. The Malaysia History Makers software requirements are indicated and the project schedule planned is presented. The chapter ends with the terminology used in this chapter.

Chapter 2

Literature Review

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Literature review is an evaluative report of information found in the literature related to selected area of study. In this project, literature review includes writings on case study, thesis reports, articles, books, and also annual reports on educational software. Review of existing software will presents selected educational software that has several similarities to this educational software.

Five educational software specifically on history has been chose for this purposed. The software are:

i. KASTALIA Software (software for Greek's High-School History & Art)
ii. Black History Software - Black History in America
iii. Complete US History (1500-1895)
iv. History Channel: The Ellis Island Experience Software
v. The Complete WWII Collection, Express Edition

During the information searching, several methods were use to gain all the information needed. Search engines such as Google, Yahoo, Altavista, etc. were used to search related topics. Keywords that were used while searching are "educational software", "interactive software", "history educational software", "history makers software" etc. Metasearch engine were also been used (EZ2Find Search Engine). To

search for existing related software, Amazon.com were used for that purposed. Amazon.com offers various kinds of products such as books, software, apparel, magazines, etc. includes personalized recommendations.

2.2 Previous Writing on Educational Software

2.2.1 Historical Background on Educational Software

Rushby (1983) cited by Charles Albert P.G. (1995) indicated that the model of learning process has been developed in the early 1920's by educational psychologists and this has continue to the present day. These models were used as a basis for programmed instructions (PI). PI consists of text divided into a number of frames each consisting of information to be read, questions to be answered, the correct answer and the instructions on how to proceed to the next frame. PI was used on a large scale in the American army during the second world war. Just after the end of the war in the early 1950's, the first true "automation" of programmed learning began. Pages of the text to be learnt were turned by mechanical devices (Rushby , 1983).

Early computer assisted instruction was based on the computer taking over this mechanical function. As the capacity of computers has grown, so the way in which the computer functions in educational software has changed. Today, computers enable users to develop multimedia educational software. Thus, a natural progression of systems began which contain and control the presentation of interactive educational frames.

2.2.2 Educational Software Development

Development and use of educational software has increased due for demand for in-company training at multinationals and big national companies, to large national programs for formal education for several countries, and to emerging perspectives in the free market for educational software and entertainment products. Sometimes the market for expensive strategic products, e.g. aircraft, telephone systems, military equipment, information systems produces a demand for educational software to train employees to use or maintain the product.

The most essential aspect of educational software is interactivity. The use of information technology to support teaching, training learning, entertainment, and education in general emerged several decades ago. Many claims about the relative value of the educational software have been made. Although it has been difficult to prove the advantages of educational software over conventional teaching, training and learning its use has increased anyway and many attempts have been made to develop educational software products for different subjects.

Developing educational software started within traditional instructional departments and universities. The required expertise on hardware and software was supplied by individual amateurs. Today, developing educational software is also carried out by information system developers; with the required expertise on subject matter and instruction technology being supplied by individuals considered to be "problem owners" or "consumers". In both extreme cases and all situations between, the main bottle-neck for developing educational software successfully is the communication and co-operation

between the different disciplines involved. Moreover, this problem has increased due to the new multimedia features modern computers can support.

2.2.3 Pedagogy of an Educational Software Learning Environment

Educators today realize the rich potential that software technology can offer in terms of pedagogy for the purpose of teaching and learning especially in education that requires learners enhancement in knowledge and skills. The unique features of educational software today, as powerful tools for information manipulation have led to high levels of expectation on the part of educational community.

The special features educational software that can support various forms of information manipulation lead to the expectation to many users that the software technology will substantially contribute to the teaching and learning process, utilizing the current pedagogical approaches. Hanizar, Zuraidah (2002) indicated that the current pedagogical approaches that support learning processes require the active involvement of the students in the construction of knowledge, their interaction with peers and expert, the adaptation of instructions to individual needs and new ways for the assessment of student knowledge and learning. It is expected that the developmental process of educational software would be based on this approach.

The student is the most important user of educational software. In traditional didactic styles the role of the student was "designed", sometimes in minute detail. In the modern style of open learning environments the student can choose to some extent, the role she wishes to play. She is free to navigate through and to spend more or less time on

components of an educational software package she is interested in and it may be applied as a personal tool to support learning whenever wanted.

Successful assimilation of technology will depend on the individual increased awareness about the relevant essential features of the educational software technology for the development of the appropriate teaching practices. It is quite natural that the characteristics of such a transition will lead to various stages of evolution that will generate new educational software models and trends that are based on substantial educational needs and requirements that can support both current and future pedagogical approaches.

2.2.4 User Interface Design on Educational Software

The interface is the visible personality of software. It bridges the gap between the programming that makes the software work and the human using the software. Interface design does not happen in a vacuum. It is only a part of the process of product design, and every phase of that process affects every other phase.

The essential aspect of educational software is its interactivity. So, educational software can be regarded as an area where educational design and user interface design meet. For this reason it is interesting to describe the components, characteristics and techniques used in developing educational software that are inherited from graphical user interface (GUI) and multimedia design.

Two languages are involved in this interface, one for each direction of information. One language is expressed via actions on input devices. The other can be expressed visually through graphical objects and text, and aurally through tones and synthesized words.

Interface design in educational software plays a crucial role in how learners interact with the educational content, and consequently how they acquire knowledge and what knowledge they acquire. The results showed significant achievement differences among students who used different interface styles. Interface techniques such as 'scaffolding' and gradual removal of visual feedback can promote reflective cognition and improve learning.

Direct manipulation graphical interfaces should be used with care in the context of interactive educational software learning environments. The conventional interface design guideline calling for easier interaction and exertion of minimal cognitive load does not necessarily apply to educational environments. Besides, inclusion of background music and visual aesthetics can make a learning activity more enjoyable.

2.2.4.1 Principals of Interface Design on Educational Software

The point of an interface is to allow the user to interact with the software without having to be reminded that he or she is working with a machine. Everything interface designer did, therefore, should contribute to making the users' lives as pleasant and easy as possible, at least while they are using the software.

The *principles of interface design* are the guidelines that should be kept in mind while designing any user interface. There will be times when, the designer, will stretch these guidelines, but for the most part, especially if the designer are new to interface design, designer should follow them.

The three principles of interface design are:

(1) know who the users are;

Designer need to know who they are designing for in order to effectively meet the needs of the audience. Designer can find out about users by creating usage profiles (a detailed profile of audience, including as many demographic factors as may be relevant) and task profiles (Once the designer have profiled the audience or user base for the software, they must profile the tasks those users will need to perform. Task analysis can be as simple as creating a matrix matching different user types with a list of tasks, placing a checkmark at the intersection of each task a given user type will need to perform)

(2) use appropriate design guidelines;

There are established guidelines for the field of design. These apply for graphic design, interface design, and interaction design. The designer, should be consistent, be flexible, give feedback, provide task closure, be forgiving, recognize users' limitations, and support the user's internal locus of control.

(3) remember the user.

Everything that designer do, everything that was design, should be based on the needs of the users. Designers are not designing for themselves– they are designing for the people who will sit down in front of the software and try to use it. Remember that they are there to do certain tasks, and the designer make it difficult, the user will not use the software.

2.3 Review of Existing Educational Software

2.3.1 KASTALIA Software *(educational software for Greek's High-School History & Art)*

Description of the software:

The software offers the students a computer supported learning environment suitable for historical subject representation and leads them to the formulation of arguments and reasoning contexts for constructing their own narration. It provides historical data, a variety of tools (note-pad, sketch-pad, glossary, virtual museum, data-base search and processing tool) for the elaboration of historical sources and a job-area for the study of chosen topics of knowledge domain through scenarios, activities and jobs incorporated, by the authors or by the teacher, in the educational software.

Additionally, this software supports network communication for cooperative work between students or teachers in the same or different schools. The software features :

- Instructional material that contains historical sources:

1. Fragments of acts of Ancient Greek authors, texts of newer histoirians' approaches, historical terms and biographies.
2. Images of Ancient findings (pots, coins, inscriptions, buildings, sculptures)
3. Historical maps

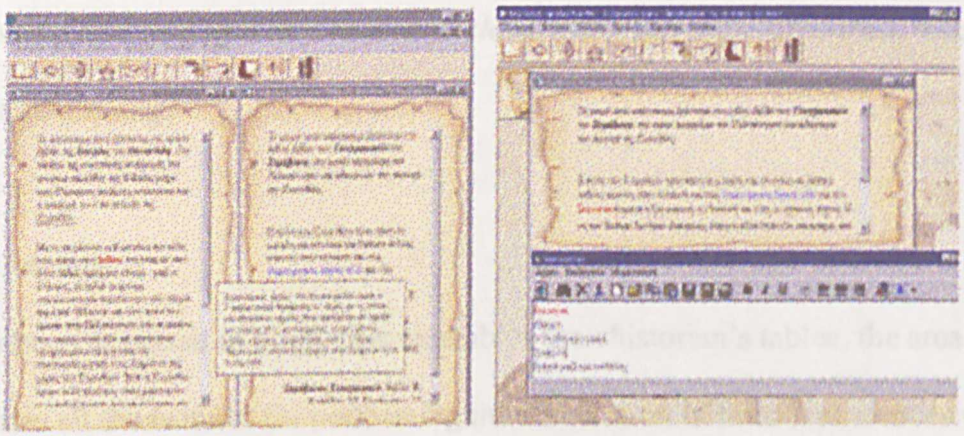


Figure 2.1: Sources' windows, use of note-pad

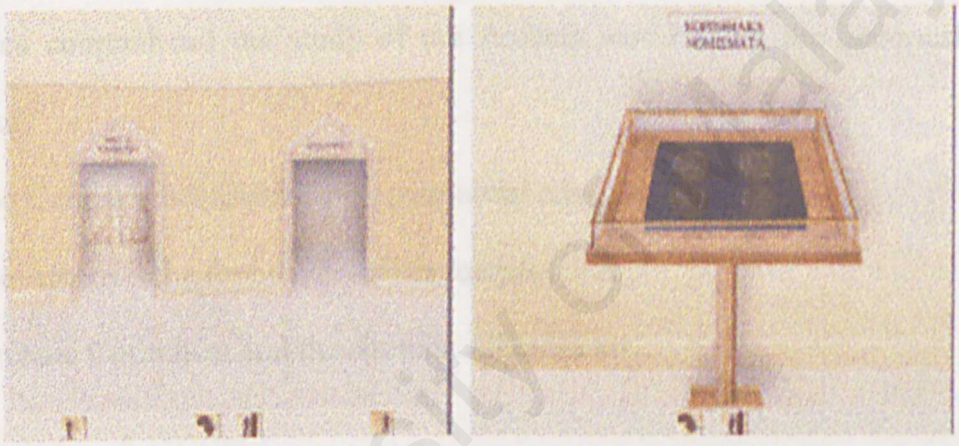


Figure 2.2: Virtual museum and show-case of Corinthian coins

- Tools categorizes in:

1. *Study tools* for historical material elaboration, information searching and keeping notes like the note-pad, the sketch-pad, the glossary, the virtual museum, the students workbook and the data-base search tool.

2. *Instructive tools* distinguished in:

- Instructional scenarios that are referring to topics and are supported by activities and jobs either proposed by the software or created by the teacher.

- Tools for software enrichment with new sources or scenarios.

3. *Network tools for communication and elaboration* like electronic-mail, text chat, application sharing.

- Job area

that has been designed in a way that resembles the «historian's table», the area that carries all the features for performing the elaboration of historical sources within a familiar to the students environment.

The topics comprehend the study of the Archaic world using the historical sources consists of :

1. Archaic Corinth – Mediterranean commercial city
2. Archaic Athens – the foundation of democracy
3. The Archaic Corinthian and the Archaic Athenian art

2.3.1.1 Evaluation 1

Users will found out that this software is rather uninteresting to be applied for such a long period of time. The interfaces are too much text, which contains too much information that led to compactness. There are lack in audio elements, besides the choice of uninteresting music. The interface contains less animation effect that brings to static environment to the software.

2.3.2 Black History Software - Black History in America

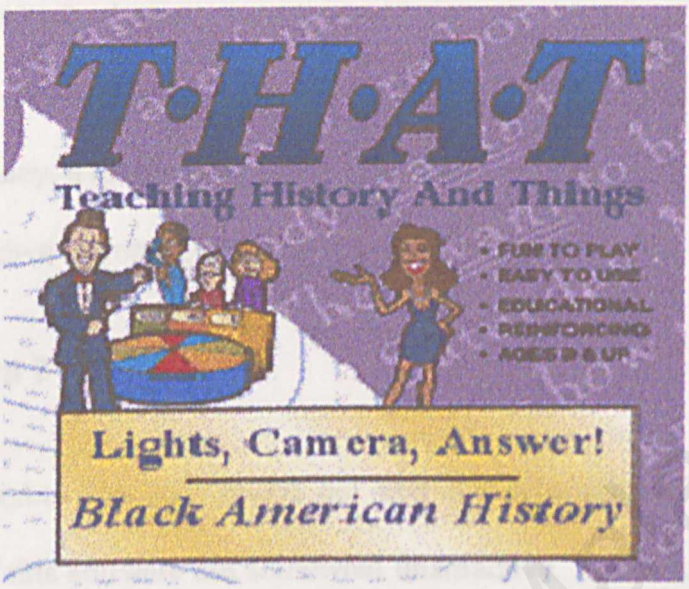


Figure 2.3 Black History Software Package

Description of the software:

By interacting with the facts and trivia contained in this software, students will be motivated to research the stories behind these facts, the spirit behind the information, and the power within that knowledge in order to gain a deeper understanding of how the past has shaped the present and the present continues to shape the future. The topics categories comprehend (parts of selected interesting topics):

a) Famous Black American Authors

b) Civil Rights Leaders

c) Black American Inventors

d) Civil Rights Legislation

Users are able to learn as play the game format learning packages, consists of:

a) Pop Quiz - multiple choice

b) Match-Mate – matching

c) Wheel of Money- a timed quiz

d) Paired Squares- a memory game

2.3.2.1 Evaluation 2

On the very first sight, user will found out that the selections of foreground and background color of this software are somewhat unattractive. The choices of color are not harmonious. Plus, the information in the software was not complete at all. Perhaps because this software was developed for children used.

2.3.3 Complete US History (1500-1895)

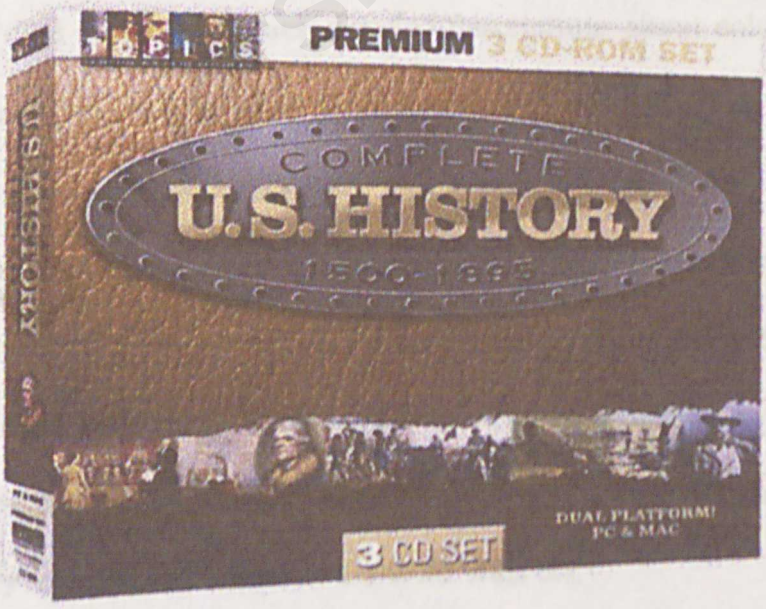


Figure 2.4 Complete US History (1500-1895) Package

Description of the software:

Complete U.S. History (1500-1895) combines three interactive, comprehensive software programs on the historical beginnings and growth of the U.S., from the founding of America to the Wild West experience. The software teaches history interactively through a multimedia platform, using movies, role-playing, historical photographs, and other primary source materials.

In Founding of America, experience the true colonial experience by role-playing four different characters with unique backgrounds and goals in life as Americans. The role-playing simulation covers American history from 1630 through 1820, and the decisions user make as chosen character are based on real American historical challenges of the time period.

The Colonial period of American history comes to life with *The Colonial America Encyclopedia*. Filled with biographies, detailed descriptions about colonial life, maps, videos, audio narration, and primary source materials, every inch of colonial life is uncovered through an interactive platform. This in-depth software program follows the birth of America's original 13 colonies, through the Revolutionary War, and up to the formation of the Union. With the *Wild West Encyclopedia*, explore everything from Lewis and Clark's expedition to the Pacific Northwest to the battle at Alamo and the building of railroads. This title features a huge collection of historical photographs, video clips, and primary reference materials on the Wild West era.

The software features:

a) Learn the historical beginnings of the United States

b) Videos, role playing, and historical photographs

c) Biographies and detailed descriptions

d) Maps, videos, and audio narration

e) Follows the birth of America's original 13 colonies

2.3.3.1 Evaluation 3

The characteristics of maps are somewhat interesting. It is good to have maps pertaining to that era specifically. Although the interface are good and user friendly, but the software is completely a game. Its educational value does not live up to what is promised on its cover, very misleading. The primary resource material was not clear.

2.3.4 History Channel: The Ellis Island Experience Software

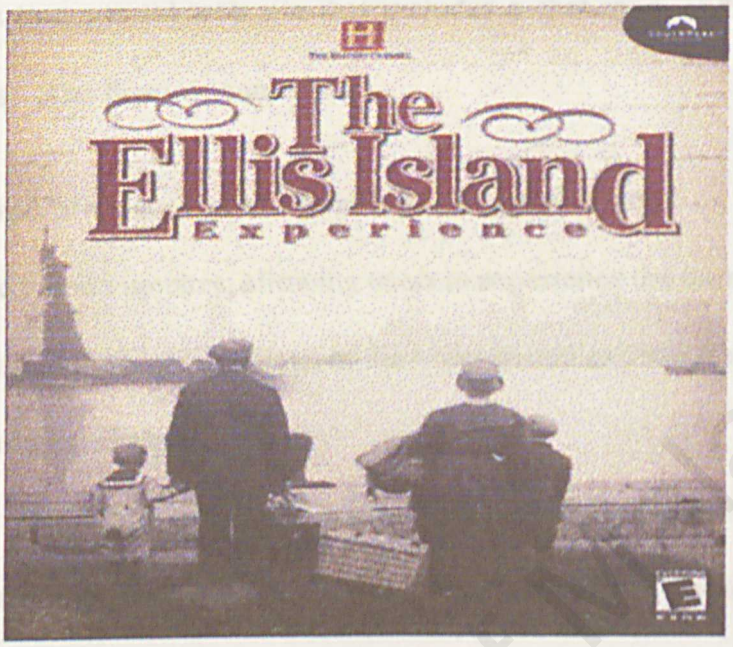


Figure 2.5: History Channel: The Ellis Island Experience Package

Description of the software:

This interactive documentary integrates extensive archival footage, original documents and artifacts, glorious photographs, poignant remembrances of people who passed through Ellis Island, and interactive video vignettes that allow users to experience first-hand the trials and triumphs of immigration. *The Ellis Island Experience* captures the drama of the greatest migration in human history.

There are five fascinating chapters to explore: The People of America, The Old World, The Voyage, The Golden Door and The Land of Dreams. Each chapter contains as many as 40 sections, consisting mostly of narrated slide shows, videotaped first hand accounts of immigrants and digitized images of historic memorabilia. The content and

overall presentation is accurate, well-balanced from an editorial perspective and professionally done. Features include the ability to search by keyword, a glossary of terms and access to a special web site that includes a chat room and occasional web casts of historians. The features consists of:

a) Over 2 hours of video, including exclusive original footage
b) Interactive video vignettes, allowing users to experience the immigration process
c) Compelling first-person accounts of the immigration experience, recorded by the Ellis Island Oral History Project
d) Hundreds of rare historical documents, artifacts, and photographs
e) Fully searchable content with Save and Print capabilities for text, images, and transcripts

2.3.4.1 Evaluation 4

It is fun to just click a mouse and hear the sights and sounds of the experience of the millions of people who arrived America through Ellis Island from 1892 to 1954.

There's a lot of information here, but, more than that, it is an experience. User heard the sound of the steamship whistles, saw rare films and photos of the immigrants, we listen to oral histories, learn about the Old World and its political upheavals, the challenges the immigrants faced, the whole story of immigration.

Perhaps it was the intent of the program, it impossible for the user to view this in a logical order. Just clicked away in a variety of areas which kept opening up to deeper

and deeper layers of historical fact and insight. Some of it could be absorbed quickly, such as the wonderfully interactive portion where a short re-enacted film shows immigrants walking up to inspectors. There are other parts though that require a lot of reading and patience.

The easy navigation on this software allowed user to click on the things that interested them the most. But, user will find that the musical score in the background was rather brooding and distracting.

2.3.5 The Complete WWII Collection, Express Edition

Figure 2.6: The Complete WWII Collection Package

Description of the software:

The Complete WWII Collection, Express Edition contains three individual titles

that were selected for their high-quality content and ease of use. The first title, Warbirds, is a complete drawing program that includes drawing and editing tools, scalable typefaces, a special collection of famous aircraft, and more than 1,000 general-purpose clip-art images and special effects. A drag-and-drop clip-art viewer allows the user to select images from dozens of libraries and drop them in the drawing area. The sound effects database includes clips of flybys, special effects, air raid sirens, machine guns, explosions, and antiaircraft fire.

The History of World War II includes a narrated chronology that covers the major battles of the war. Each entry includes a dramatic photograph of the events, and many have original film footage and related items. Also featured in this program is a section on the causes of the war chronicling the major events in Europe and Asia that led to global conflict. Finally, test knowledge with WWII Shootout, an interactive trivia game on the greatest conflict in history. More than 500 questions on WWII are contained on this CD-ROM, and cover everything from the war in Europe to the great battles in the Pacific. The features in this software:

a) CD-ROMs on the greatest conflict in history
b) Narrated chronology covering the major battles
c) Photographs of the events and original film footage
d) Complete drawing software with special WWII features
e) Test knowledge with WWII Shootout

2.3.5.1 Evaluation 5

There is not enough information in the software. Those are not stated in detail. For more efficiency in narrating the events, the software should contain virtual maps. So that the user are able to imagine the real events clearer.

2.4 Analysis from Existing Software.

From the existing software, an analysis has been done to compare the features within. For this purpose, 10 software has been chosen for the comparison between the features provided. Not only on the market software, the software developed by students from student's previous thesis proposal also been selected.

Five selected software from the market; KASTALIA Software (*educational software for Greek's High-School History & Art),* Black History Software, Complete US History (1500-1895), History Channel: The Ellis Island Experience Software and The Complete WWII Collection, Express Edition.

While five selected software developed by students; Interactive Multimedia Educational Package, SeMat-Primary School Mathematics Learning Package, M-SIGN (A Computer Aided learning Package For Malaysian Sign Language, Geography PMR Learning Package and DIYC-Do It Yourself Computer.

The analysis from that 10 selected software has been concluded in a table form as presented in Table 2.1.

No.	Features	A	B	C	D	E	F	G	H	I	J
1	historical contents	√	√	√	√	√					
2	audio	√	√	√	√	√		√	√	√	√
3	video			√	√	√			√		
4	games / quizzes	√	√			√	√	√	√	√	√
5	graphic images	√	√	√	√	√	√	√	√	√	√
6	photographs	√	√	√	√	√					√
7	maps	√		√							
8	save and print capabilities	√	√	√	√	√	√	√	√	√	√
9	search options	√	√	√	√	√	√	√	√	√	√
10	network tools	√									

Table 2.1 : Analysis from existing software

Legend (Software Titles)

A : KASTALIA Software (*educational software for Greek's High-School History & Art)*

B : Black History Software

C : Complete US History (1500-1895)

D : History Channel: The Ellis Island Experience Software

E : The Complete WWII Collection, Express Edition

F : Interactive Multimedia Educational Package

G : SeMat-Primary School Mathematics Learning Package

H : M-SIGN (A Computer Aided learning Package For Malaysian Sign Language

I : Geography PMR Learning Package

J : DIYC-Do It Yourself Computer.

From the analysis, a lot of conclusions can be made. There are 10 types of features has been listed for the comparison. The features has been selected generally based on that 10 selected software. From the table, obviously all the software had graphic images, search options besides save and print capabilities. As graphic images plays an important role in a software, it has been applied to most software for efficiency. So are the other features like audio, video, photographs and maps. But it hasn't been applied extensively except for audio that has been applied by 9 out of 10 selected software.

Base on historical contents, very rarely software on history based on local contents can be found. Mostly about American History software. Only 10% of the selected software (1 out of 10) has network tools that provides e-mail and text chat besides application sharing. The other software used CD-ROM as the media, but this exclusive software supports networks communication for cooperative work between students or teachers in the same or different school.

2.4.1 Features to be adapted in Malaysia History Makers Software

After the analysis of those selected software have been done, the features to be adapted in Malaysia History Makers software have been made. Just after analyzing the advantages and disadvantages of those features, the selected features to be adapted in Malaysia History makers Software are as indicated below:

a) Biographies of Malaysia history makers (HM)

b) A photograph of the HM

c) Quizzes and games for fun learning and memory testing

d) Audio and video archives for interactive learning

2.5 Chapter 2 Summary

Chapter 2 explains the various research and fact-finding methods that were carried out to find out the requirements needed for this software. Surveys on existing software were undertaken and the analysis were done and presented. On the whole, literature reviews play a vital role in determining features as well as the requirements that have to be incorporated into the software.

Chapter 3

Methodology

CHAPTER 3: METHODOLOGY

3.1 Development Methodology

A software development methodology is a series of steps and rules for developing a software system that based on a software engineering process. In a software development, the methodology prescribes; steps involved in each phase, tasks involved in each step, nature of the task, order the tasks are to be performed, outputs to be produced at each step or phase, documents that are required as input to each step or phase, the people that should be involved at each stage, how the project should be managed and controlled, support tools and also user training needs.

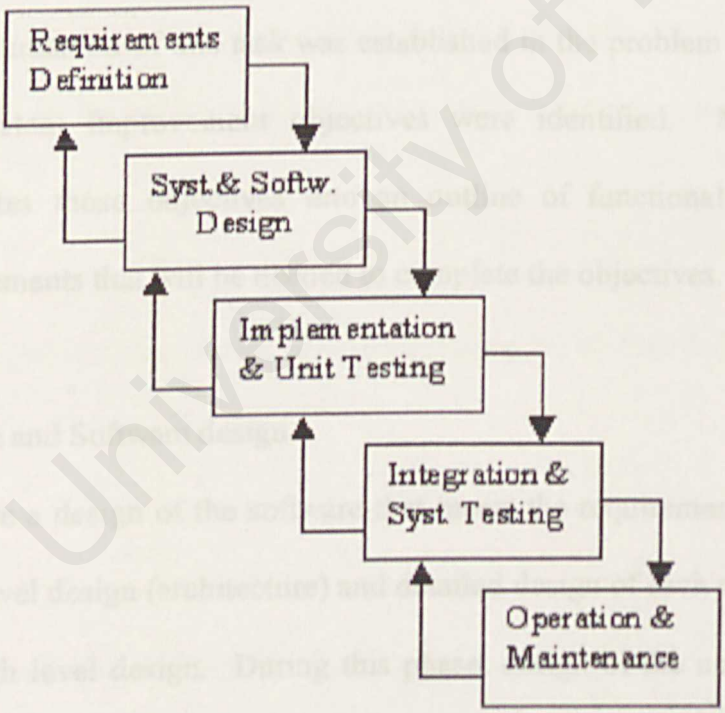


Figure 3.1: Waterfall model development methodology

3.1.1 Waterfall Model Methodology

In Malaysia History Makers software development, waterfall model has been chose as the development methodology. Waterfall model is most widely used software process model that has a systematic and sequential approach to software development. The development of a software system are divided into stages or phases that specifies activities involved, sequence in which the activities are ordered and deliverables produced for the phase. The phases (5 main stages) in waterfall model includes:

a) Requirements Definition

The initial task of the requirements analysis phase is to identify requirements. The foundation of this task was established in the problem analysis phase when the system improvement objectives were identified. Minimally, this task translates those objectives into an outline of functional and non-functional requirements that will be needed to complete the objectives.

b) System and Software design

Produce a design of the software that meets the requirements beside involves a high level design (architecture) and detailed design of each of the components of the high level design. During this phase, design of the user interface are very important.

c) Implementation and Unit Testing

In this phase, it will install the system in the 'live' environment beside training the users. Unit test are independent testing of each component in order to produce user documentation.

d) Integration and System Testing

Integrating all components and testing them together besides testing the software to ensure that the system meets its requirements

e) Operation and Maintenance

This phase includes supporting (changing) the live system, correcting defects reported by the users and implementing enhancements requested by the users.

3.1.1.1 Advantages and Disadvantages of Waterfall Model

Advantages of a defined, agreed and documented approach:

a) *flows well, easy to understand from a broad viewpoint*

b) *consistent approach to software development is achieved*

c) *improved communication between developers*

d) better control of progress by using each phase as a milestone or checkpoint

e) more predictable application development projects

f) greater chances of project delivery on time and within budget

Problems with Waterfall Model:

a) *projects rarely follow the sequential flow*

b) *difficult to identify and define all the requirements explicitly initially*

c) *not user centered or user focused - re. documentation,involvement etc.*

d) *working version of software not available until late in the life cycle*

e) problems may not be detected until late in the life cycle

3.1.2 Why Waterfall Model Methodology was Chosen

Even if there are some weakness in waterfall model, I find that the advantages out-weigh them. Unlike the Rapid Application (prototyping model), the waterfall model has a clear step-by-step phase where the phase is required to be completed almost flawlessly before proceeding to the next phase. The prototyping method is more of a trial an error process. This method wastes time and cost. Even so, some people may prefer the prototyping model method because they like to experiment but I, on the other hand, prefer to have a clear and well-defined steps to follow to ensure a high quality and error-free product as the deliverable in the end.

3.2 Information Gathering Techniques

3.2.1 Reading

Collecting facts from existing documents through reference books for better understanding in certain topics, articles, thesis, case study, etc. All documentation collected were analyzed to determine the information's currency but the outdated documentation weren't discard because additional fact-finding will be needed to verify or update the fact collected. These are main books used for reference:

System Analysis and Design

This book was use to understand the functional and nonfunctional requirements besides the user interface design method

Macromedia Director 8.0 and Lingo Authorized

This book was use to learn on how to use Director 8.0 and Lingo Scripting

3.2.2 Observation

Through existed educational software in CD-ROM format beside online software. By observing the offered features of the selected software (KASTALIA Software (*educational software for Greek's High-School History & Art),* Black History Software, Complete US History (1500-1895), History Channel: The Ellis Island Experience Software and The Complete WWII Collection, Express Edition), better conclusion can be made in order to fulfill the user requirements.

3.2.3 Internet Surfing

Using search engines such as Googles, Yahoo, Altavista, by using keywords such as "educational software", "interactive software", "history educational software", "history makers software" etc. Exploring Internet via personal computer provide the analyst with immeasurable amounts of information. The detailed of main sites surfed are:

http://www.adobe.com

This sites provide information about Adobe software development tools such as Adobe Photoshop, Adobe Illustrator, Adobe Page Maker, Adobe Premiere, etc.

http://www.macromedia.com

provides information about macromedia development tools such as Flash, Director, Authorware, etc.

www.es.cf.ac.uk/Dave/Multimedia/node39.html

Provides information about Macromedia Director 8.0, the features in Director 8, advantages and disadvantages of using it as authoring tools are also explained in this site.

3.2.4 Gathering users requirements

Through questionnaires that are a special-purpose documents that allow the analyst to collect information and opinion from respondents. The document can be mass produced and distributed to respondents who can then complete the questionnaire on their own time. 30 sheets of questionnaire had been distributed to 20 students and 10 teachers

in a selected secondary school called King George V Secondary School in Negeri Sembilan which located in Seremban town. Those people are potential users of this software. The enclosure of the questionnaire has been attached at the appendix section.

3.2.4.1 Questionnaire Analysis (Part 1 Questionnaire Set) -selected questions

a) Feedback from Question 2:

Did you find that learning using interactive educational software software somewhat fun and interesting?

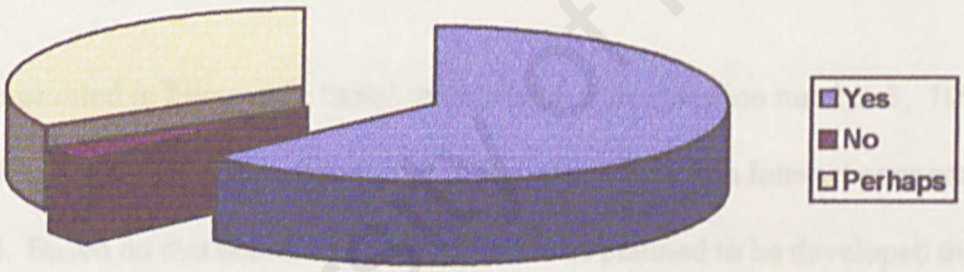


Figure 3.2 Pie chart for Questionnaire Feedback from Question 2

As presented in Figure 3.2, based on feedback from question number 2, 63.3 % of the respondents claim that they find learning by using educational software somewhat fun and interesting. While 3.3% denied that statements. The rest of them (33.3%) claim that perhaps the software are somewhat fun and interesting. I can be said that using interactive educational software in learning might attract user interest.

a) Feedback from Question 3:

Did every computer in your school have Internet connection?

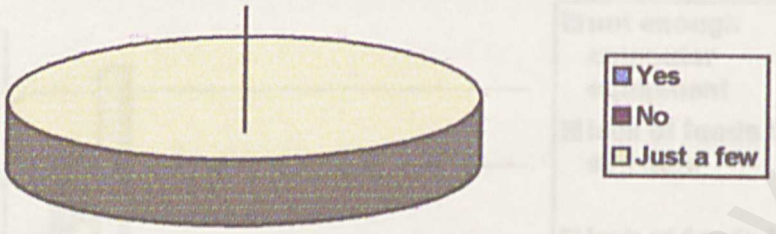


Figure 3.3 Pie chart for Questionnaire Feedback from Question 3

As presented in Figure 3.3, based on feedback from question number 3, 100% of the respondents indicated that there are only a few computers with Internet connection in their school. Based on this condition, this software was planned to be developed through CD-ROM as the media, not web based learning package. This will give advantages to user who's not connected with the Internet.

c) *Feedback from Question 10:*

What do you think are the barriers in using educational software in school? (you may choose more than one)

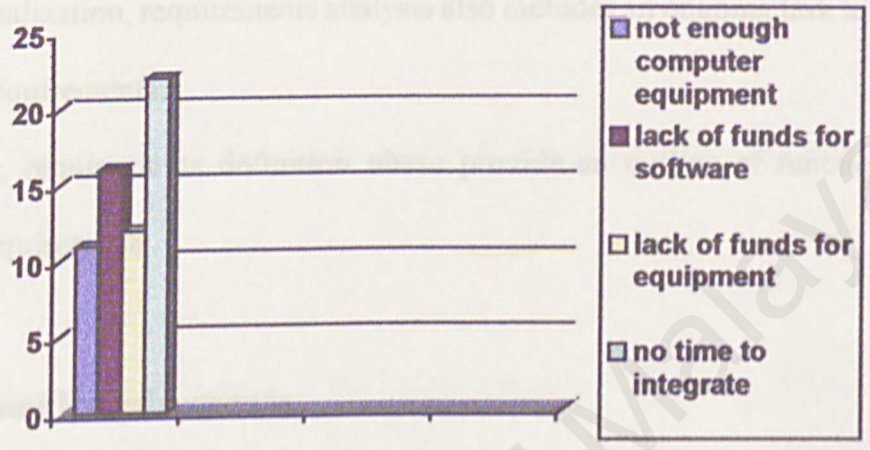


Figure 3.4 Bar chart for Questionnaire Feedback from Question 10

As presented in Figure 3.4, based on feedback from question number 10, majority (22 respondents) of the respondents chose that they have no time to integrate with the use of educational software in school. Perhaps, they have to cover a lot of subject during school time, that led to this scenario. Other barriers are indicated as not enough computer equipment, lack of funds for software and lack of funds for equipment.

3.3 Requirements Analysis

The requirements analysis phase identifies what the new software is to do without the consideration of technology; in other words define the business requirements for a new system. The key in this phase is *what*, not *how*. Because requirements are a moving target with no finalization, requirements analysis also includes an ongoing task to manage changes to the requirements.

Basically, requirements definition phase provide an outline of functional and nonfunctional requirements.

3.3.1 Functional Requirements

A functional requirements is a description of activities and services a system/software must provide. Functional requirements are frequently identified in terms of inputs, outputs, process, and stored data that are needed to satisfy the project improvements objectives. In this software, then functional requirements describe the modules contained. There are 5 main modules in Malaysia History Makers-*MhM* software. Those modules are:

a) About MhM – a brief description about the software

b) History Makers (by category):

- Royalty
- Prime Ministers
- Political Makers
- Business Makers
- Military Makers

- Entertainment Makers
- Sports Makers

c) Quizzes – multiple choice format quizzes, where users may check the correct answers

d) Games - Crossword puzzle, match-making games format for interactive and fun learning method.

e) Resources - list out the source of featured information

3.3.2 Non Functional Requirements

A nonfunctional requirements is a description of other features, characteristics, and constraints that defines a satisfactory system/software. In Malaysia History Makers software, those nonfunctional requirements are:

a) User friendliness

By using buttons, graphics and screen layout that simple and friendly to the user

b) Interactivity

Between the user and the software package, it is vital to provide them beneficial experience while learning by quizzes testing and playing the games.

c) Efficiency

In order to make the software as an efficient tool, it must act responsively to user's requirements and need.

d) Reliability

The software does not produce dangerous of costly failures when it is used in a reasonable manner. That is in a manner that a typical user expects as normal. This recognizes that a system may not always be use in the ways the designer expects.

e) Simplicity

In order to keeping form and screens properly uncluttered in a manner that focused the user attention.

f) Maintainability

The software are maintainable if the programs are easily modified and tested in the case of updating a process to meet a new requirements, correcting errors, or move to a different computer system.

g) Understandability

In terms of the coding method used, allows other programmers the logic or the program flows, thus changes can be made easily upon the necessary program segment without modifying other essential logic of the program. Simple and clear sentences or messages are displayed, so that the users can use this software without difficulty.

3.4 Consideration of Development Tool

Selecting the most suitable development tool is very important towards producing high quality multimedia based educational software. In order to fulfill this needs, several development tools has been chose such as Macromedia Director 8.0, Macromedia Flash 5.0 and Adobe Photoshop 7.0. Frequently, multimedia developer used Macromedia Director 8.0 for their software development because the ability to combine various elements likes audio and video applications.

3.4.1 Macromedia Director 8.0

Macromedia Director 8.0 was chosen because the ability as a multimedia authoring tool that create rich interactive content for both fixed media and the Internet. Besides, most importantly, the ability to create the most media-rich, high-performance content for CD/DVD-ROM that suited most perfectly to *MhM* development. Director can incorporate photo-quality images, full-screen or long-form digital video, sounds, animation, 3D models, text, hypertext, bitmaps, and Macromedia Flash content.

Macromedia Director 8.0 offer comprehensive capabilities for multimedia authoring, and is differentiated both by the breadth of multimedia file types that can be integrated and controlled, and by the ease with which the resulting content and applications can be deployed for optimal playback across platforms. Director also enables developers to create accessible content for people with disabilities, or easily repurpose existing Director content to meet government accessibility guidelines.

The ability of this software quite hard to be competed by any other multimedia development tool like ToolBook II or other software. Director are able to provide high

quality multimedia software. Director are more flexible and suitable to be used for multimedia software development that enable other applications combined together such as Flash, Freehand, Authorware, etc altogether.

Director 8 is chosen as main authoring tool because it has more advantages compares to other authoring tools in order to develop this software. Visual Basic (VB) is another common tools for development. However, VB is not chosen for use because it can be only used on Window platform, whereas Director 8 is suitable for use on both Macintosh and Windows platforms. Other advantage of Director 8 over other tools is that the text and multimedia content can be linked to the project allowing content files to be casing maintained separate from the Director 8 project. In addition, linkage based includes make reusing content files in the final programming environment feasible.

3.5 Consideration of Operating System

Windows 98 is chosen to be platform to this project. Windows 98 is upgraded to windows, that make computers works and play better by providing better system performance along with easier system diagnostic. With Windows 98, the software plays better as well with support for the graphical, sounds and multimedia technologies, the ability to easily add and remove peripheral device with support for this learning package. As such, Windows 98 is very suitable because it is more stable and has a lot of features compared to other operating system.

3.6 Hardware Specification

Malaysia History Makers software – *MhM* needs minimal hardware specification based on Table 3.1:

HARDWARE	MINIMUM SPECIFICATION
Micro Processsor	200 Mhz
RAM	64 MB
Hard Disk Space	110MB
Operation System	Windows 95/98/ME/2000/XP
Color Resolution	16 bit
VGA	8 MB
Input Device	Keyboard, mouse
Output Device	14" monitor

Table 3.1 Minimal Hardware Specification for Malaysia History Makers Software

3.7 Chapter 3 Summary

Chapter 3 elaborates all the information needed in system requirements and analysis. First part of the chapter explains about the methodology used in developing the software. The method used is waterfall model and every step of the method is elaborated together with the chart of the methodology.

In defining the requirements, information-gathering techniques were adapted in order to gather related requirements of this software. The techniques include reading, observation, Internet surfing, and gathering user requirements by questionnaires. All of those techniques have been done in order to obtain the information needed in *MfM* software.

In developing a multimedia interactive package, a selection of authoring tools have been analyzed the most suitable authoring tool which can perform according to requirements. Macromedia Director 8.0 has fulfilled these criteria.

Chapter 4

System Design

CHAPTER 4: SOFTWARE DESIGN

4.1 Introduction

One of the most exciting parts of the software development process is designing the interface, or the part of the software that users see and interact with. The interface is the visible personality of software. It bridges the gap between the programming that makes the software work and the human using the software. This guide describes the software development process, including the interface design phase.

Interface design is a specific kind of design. As in other types of design, the designer will take information and organize it in meaningful ways. The information usually comes from a document called a requirements specification. The designer tries to optimize the organization of the information so that it makes sense to a certain group of people: the software's audience, or group of users.

Design stages are one of very important element in a software development. This pictured the first sight to the users on how far the ability of this software to attract users interest. Usually, attractive interface contains beautifully creature graphics element that was different with existed interface. To be more specific, a user interface that never been featured before (design by the developer).

4.2 *MhM* Interface Design

User interface design is concerned with the interaction between the user and the computer. Graphic design is sometimes confused with interface design. Part of creating *MhM* software interface is selecting colors and creating or choosing graphics, icons, backgrounds, and other media elements. Interface design will refer to the design and organization of the most basic elements that must appear in this software. Graphic design will refer to the design and organization of supplemental media elements, such as backgrounds and illustrations.

This phase delivered the designed interface of modules in the software. For example, search option has the process in order to retrieved related data. Figure 4.1 presents the module (search option) flow chart

4.3 Story Board

Before designing the real interfaces, I have created a storyboard in order to fulfill all the requirements needed in this educational software. It is a mind burgeon in visual manner that usually contain early sketch, depicted the interfaces on a board or papers, scenarios, prototypes in software or video, besides learned to be more creative and innovative. A storyboard contains of a series of representation that focused on main action in a might happen situation.

Sketching on a storyboard is very useful in order to try various ideas of interfaces. It also can be used to help designers to think about the alternatives of interfaces and design organization.

Elements that usually have to be in a storyboard while designing user interfaces consists of:

a) Background color

b) Type of fonts

c) Size of fonts

d) Fonts color

e) Pictures that were to be use

f) Types of graphics

4.4 Expected Outcome

By applying multimedia tools such as Adobe Photoshop 7.0, the initial design for the user interface has been designed. Brown color has been used as the background and foreground with different brightness for suited the historical effect. Fancy color such as pink and bright colors are not suitable for this concept.

Figure 4.2 presents main interface of Malaysia History Makers software. It has a search box for user to type needed information. Users may also click from the category type I order to browse related information. Down side of the interface contains buttons for print and save capabilities, about *MhM*, quizzes, games and resources module.

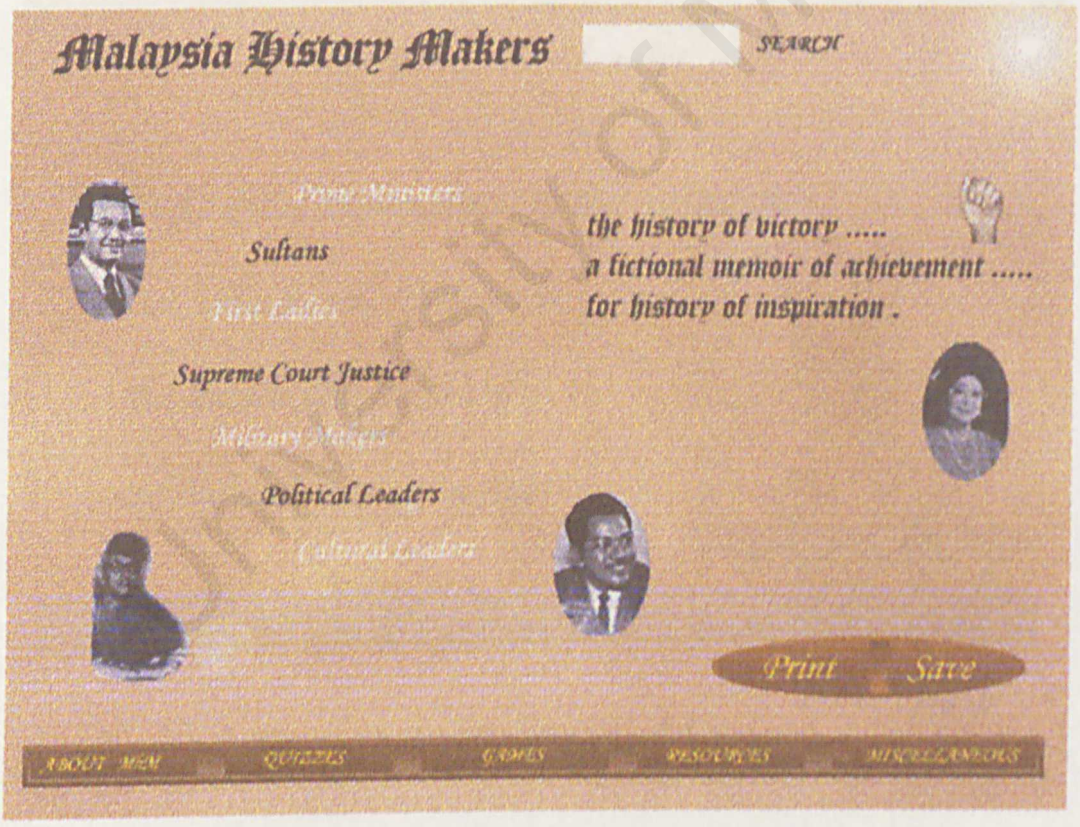


Figure 4.2 Main Interface of Malaysia History Makers Software

Figure 4.3 presents interface for selected category. This interface will appear when user choose to click selected category. For example, when a user click "Prime Ministers" from the main interface, this screen will appear. All Malaysia past and present Prime Minister will be listed out. Same as the main menu interface, down side of the interface contains buttons for print and save capabilities, about *MhM*, quizzes, games and resources module. User may click the main button between print and save button to go back to the main interface.

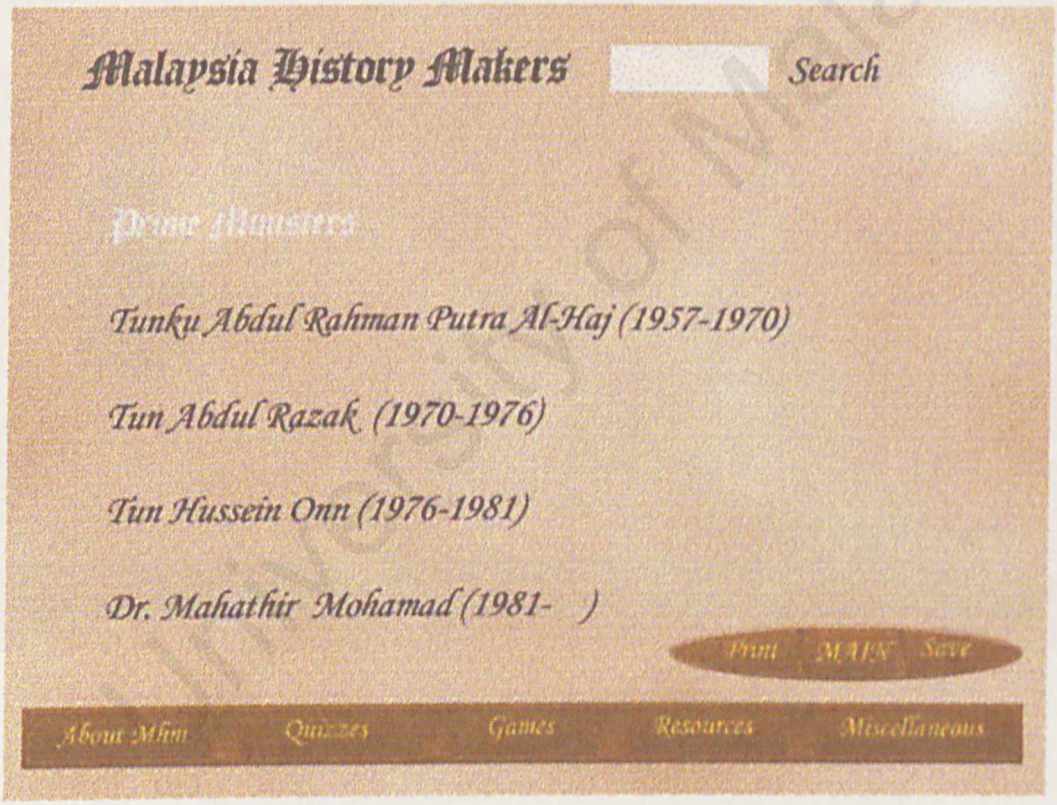


Figure 4.3 Interface for selected category

Figure 4.4 presents interface for featured biography. This interface appeared when clicked a historical figures. In this case, if a user click "Tunku Abdul Rahman Putra Al-Haj" this screen will appear. The featured biography interface contains photograph of the makers, with narrated biography. Down side of this interface is consistent with interface for selected category.

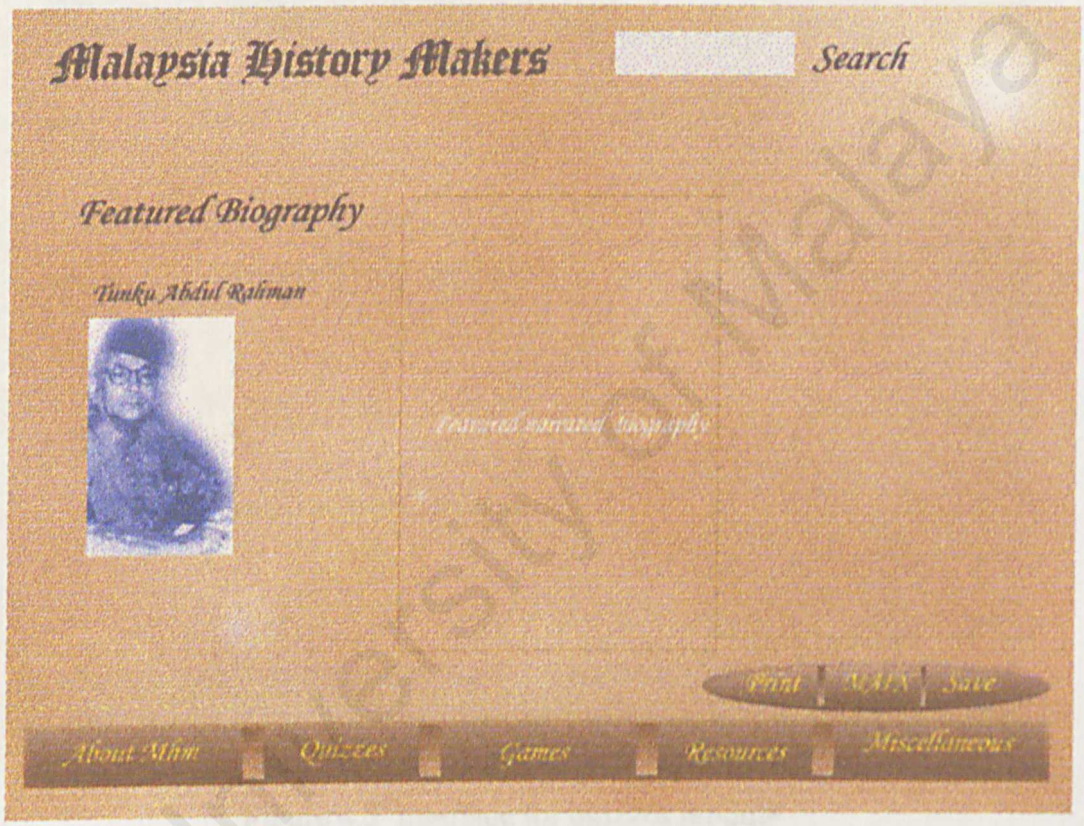


Figure 4.4 Interface for featured biography

While Figure 4.5 presents the interface for quizzes module. The quizzes are multiple choices format that enable user to check the correct answers. The down side of this interface is consistent with interface for selected category. For addition, next button is added to go to the next page for further questions.

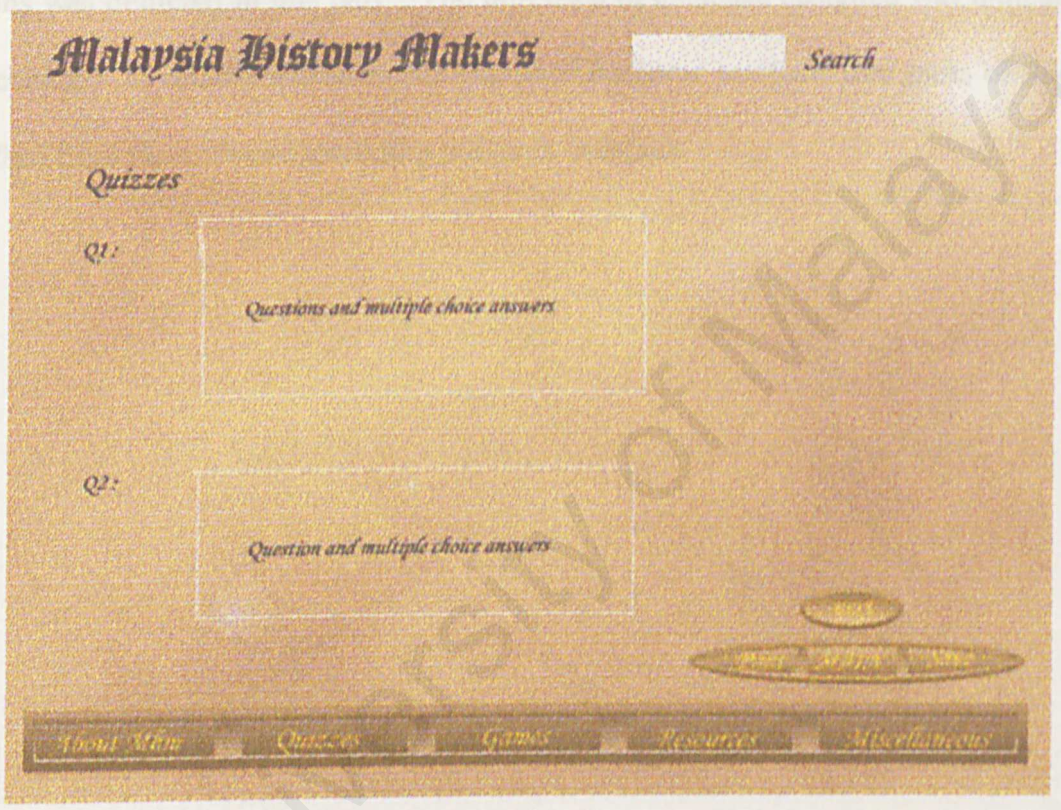


Figure 4.5 Interface for quizzes module

4.5 Chapter 4 Summary

Chapter 4 describes the combination of all the related parts into a software that contains functions that has to be done by the software. This parts incriminate interface design, information flow and modules in the software. Module flow charts for search options was depicted in this part. The purposed of database designed was indicated in this chapter. In orderly manners, the expected outcome contains four parts of selected interface from the software including the main interface.

Chapter 5

System Implementation

CHAPTER 5: SYSTEM IMPLEMENTATION

5.1 Introduction

System Implementation is the construction of the system into production includes building and testing system, which is also called the construction phase. This phase introduces the conversion of requirements and design into the development itself.

5.2 System Coding

After designing the system, the following stage is the writing of the program. At this phase, the focus is on implementing the solutions as software. In other words, the programs that implement the design must be written carefully in order to meet the goal. Coding steps translate a detail presentation of software into a programming language realization. The translation process continues when a computer accepts the source code as input and produces machine code.

There are many ways to implement a design and many languages and tools are available. In this package, since it is built using Macromedia Flash MX, the scripting language used is ActionScript scripting.

All programming language allows problems to be solving in a variety of ways. ActionScript is the Programming language for Flash MX, which allow the developer to do many wonderful things when mastering the language.

5.3 Coding Tool

Coding performs tasks that translate design into a machine-readable form. If design is performed in a detailed manner, code generation can be accomplished mechanistically (Pressman, 1992)

Macromedia Flash MX is an excellent multimedia-programming tool. It is flexible and gives the programmer good control the program yet simple enough not to overwhelm the programmer with too many scripting codes.

5.4 Coding Approach

Good programming skills will produce a reliable system;

a) Readability

Code documentation is important in readability of the test. Code documentation begins with the selection of the identifier (variable and labels) names, continues with the composition of connecting and ends with the organization of the program.

b) Naming Techniques

A good and meaningful naming technique for the variable, control and modules provides easy identification for the programmer. The naming convention is created with coding consistency and standardization.

c) Internal Documentation

Internal Documentation and comment provide a clear guide to the developer and readers about the function of a particular script code in the program. So, comments provide the developer with the means of communication with the other readers of the source code. Comments in Flash are preceded with two hyphens (--). When the program is running, the computer will ignore all these remarks. So, remarks produce no output, store no data and require no data.

d) Modularity

Before entering the coding phase, I have divided the project into several modules (as explained in the system design phase). The main purpose of the modularity is to reduce the complexity of the system and to facilitate me during implementation and by encouraging parallel development of different part of the system.

5.5 ActionScript Scripting Language / Coding Style

ActionScript is the scripting language of Macromedia Flash MX. A scripting language is a way to communicate with a program; we can use it to tell Flash what to do and to ask Flash what is happening as a movie runs. This two-way communication lets me create interactive movies.

ActionScript, the scripting language of Macromedia Flash MX, lets us add interactivity to a movie. ActionScript provides elements, such as actions, operators, and objects, that you put together in scripts that tell the movie what to do; set up the movie so that events, such as button clicks and key presses, trigger these scripts. For example, I have used ActionScript to create navigation buttons for the movie.

In Flash, we use the Actions panel to write scripts with ActionScript. Using the panel in normal editing mode, we build scripts by choosing options from menus and lists. Using the panel in expert editing mode, we enter text directly into the Script pane. In both modes, code hints us complete actions and insert properties and events. Once we have a script, we can attach it to a button, movie clip, or frame to create the interactivity we need.

ActionScript, the scripting language of Macromedia Flash MX, allows us to create a movie that behaves exactly as we want. We can incorporate new elements of the language as we learn them to accomplish more complicated tasks.

Like other scripting languages, ActionScript follows its own rules of syntax, reserves keywords, provides operators, and allows us to use variables to store and retrieve information. ActionScript includes built-in objects and functions and allows us to create your own objects and functions.

The ActionScript syntax and style closely resemble that of JavaScript. Flash MX understands ActionScript written in any previous version of Flash. ActionScript as an object-oriented scripting language, and provide ActionScript terms and basic programming concepts such as functions, variables, statements, operators, conditionals, and loops.

5.6 The Flash MX Interface.

Macromedia Flash MX provides everything we need to create and deliver rich content and powerful applications. Whether we are designing motion graphics or building data-driven applications, Flash MX has the tools we need to produce great results and deliver the best user experiences across multiple platforms and devices.

The workspace provides easy access to everything we need to create a movie.

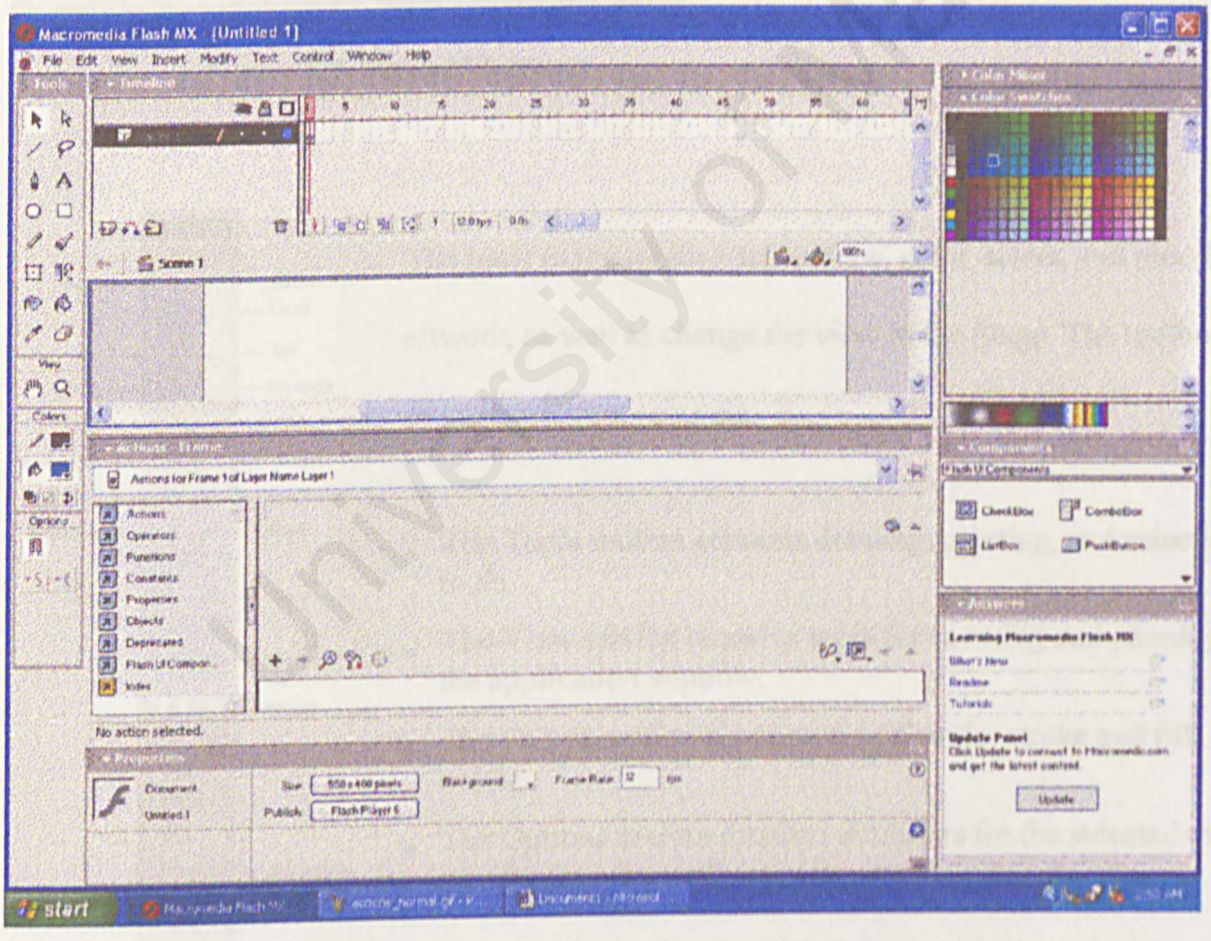
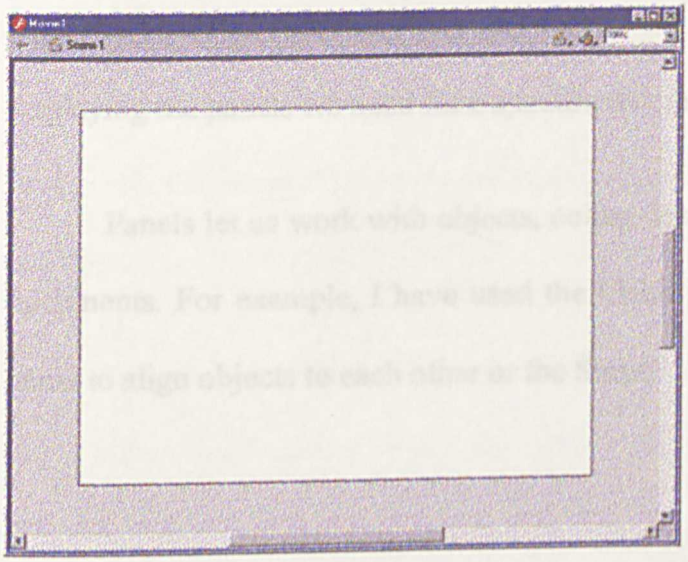


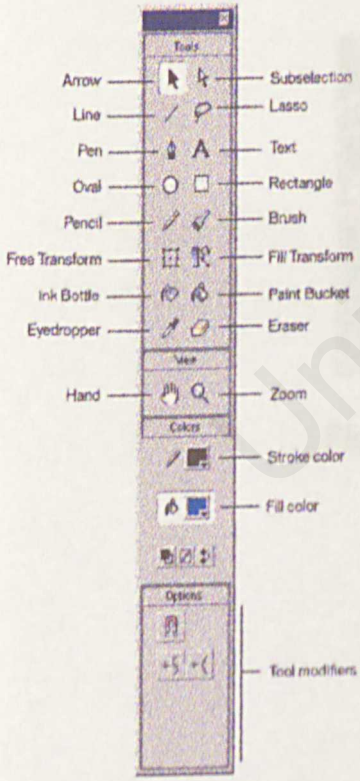
Figure 5.1 Flash MX Workspace

Each part of the workspace is described on the following;



Like films, Flash movies divide lengths of time into frames. The Stage is where we compose the content for individual frames in the movie, drawing artwork on it directly or arranging imported artwork on it.

Figure 5.2 Flash MX Stage



The tools in the toolbox let us draw, paint, select, and modify artwork, as well as change the view of the Stage. The toolbox is divided into four sections:

- The Tools section contains drawing, painting, and selection tools.
- The View section contains tools for zooming and panning in the application window.
- The Colors section contains modifiers for stroke and fill colors.
- The Options section displays modifiers for the selected tool, which affect the tool's painting or editing operations.

Figure 5.3 Flash MX Toolbox

Panels in Flash help us view, organize, and change elements in a document. The options available on panels control the characteristics of symbols, instances, colors, type, frames, and other elements. We can use panels to customize the Flash interface, by displaying the panels we need for a specific task and hiding other panels.

Panels let us work with objects, colors, text, instances, frames, scenes, and entire documents. For example, I have used the Color Mixer to create colors, and the Align panel to align objects to each other or the Stage.

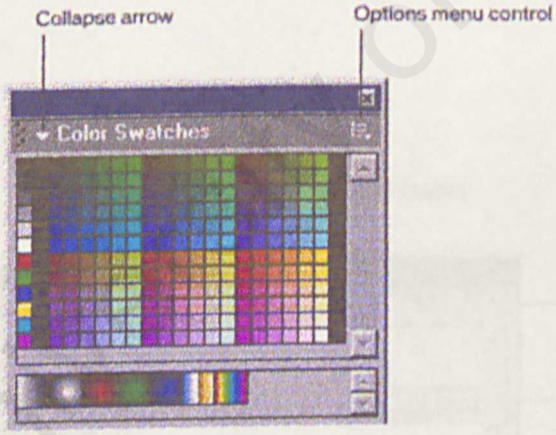


Figure 5.4 Flash MX Panel

The Timeline organizes and controls a movie's content over time in layers and frames. Like films, Flash movies divide lengths of time into frames. Layers are like multiple film strips stacked on top of each other, each containing a different image that appears on the Stage. The major components of the Timeline are layers, frames, and the playhead.

Layers in a document are listed in a column on the left side of the Timeline. Frames contained in each layer appear in a row to the right of the layer name. The Timeline header at the top of the Timeline indicates frame numbers. The playhead indicates the current frame displayed on the Stage.

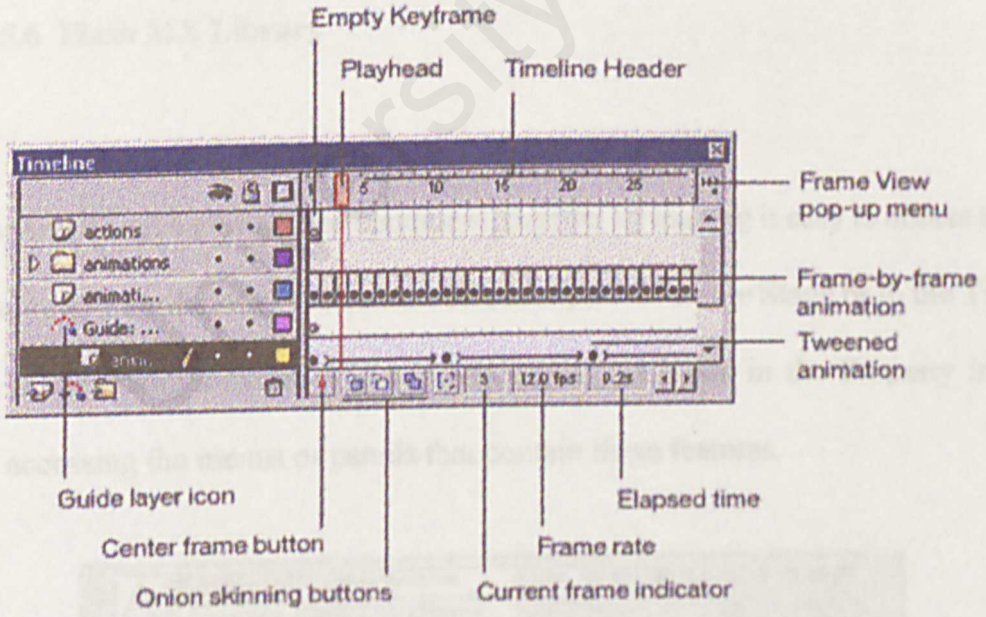


Figure 5.5 Flash MX Timeline

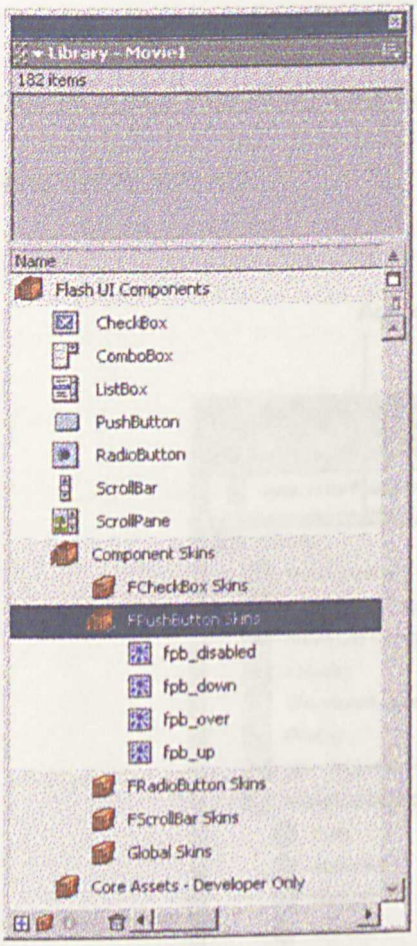


Figure 5.6 Flash MX Library

The library in a Flash document stores symbols created in Flash, plus imported files such as video clips, sound clips, bitmaps, and imported vector artwork. The Library panel displays a scroll list with the names of all items in the library, allowing us to view and organize these elements as our work. An icon next to an item's name in the Library panel indicates the item's file type.

The Property inspector simplifies document creation by making it easy to access the most commonly used attributes of the current selection, either on the Stage or in the Timeline. We can make changes to the object or document attributes in the Property inspector without accessing the menus or panels that contain these features.

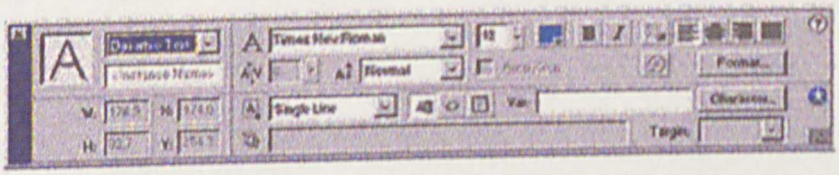


Figure 5.7 Flash MX Property Inspector

To add an action to a Flash document, we must attach it to a button or movie clip, or to a frame in the Timeline. The Actions panel allows us to select, drag and drop, rearrange, and delete actions.

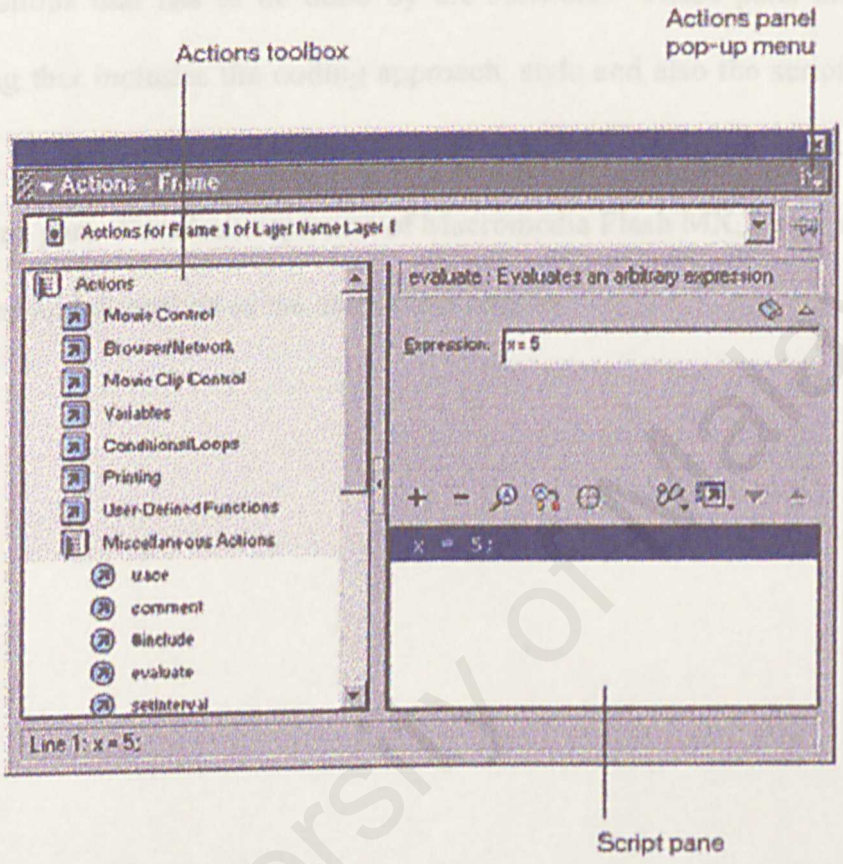


Figure 5.8 Flash MX Actions Panel

5.7 Chapter 5 Summary

Chapter 5 describes the combination of all the related parts into software that contains functions that has to be done by the software. These parts incriminate the system coding that includes the coding approach, style and also the scripting language used, which is ActionScript. ActionScript Scripting Language / Coding Style was depicted in this part. For clear depiction of Macromedia Flash MX, those interface were clearly showed and described in the end of this chapter

Chapter 6

System Testing

CHAPTER 6: SYSTEM TESTING

6.1 Introduction

System Testing is critical element of software quality assurance and represents the ultimate review of specification, design and coding. Rules that can be serve well as testing objectives are;

- Testing is a process of executing a program with the intent of finding an error.
- A good test case is one that has high probability of finding an undiscovered error.
- A successful test is one that uncovers a yet undiscovered error.

A software module is exposed to testing both during the development phase and during the test and integration phase. During the development phase, each function procedure that is part of the module is independently developed and thoroughly tested until the entire module is complete. The major difference between testing a module during its development phase and testing it during the test and integration phase is that during the development phase, errors are fixed as they are found. While during the test and integration phase failure if any are recorded and the failed module is returned along with an explanation of failure. *MhM* software has undergone 3 stages of testing before it was considered as a complete package. They are unit, integration, and system testing.

6.2 Unit Testing

Historically, quality software relied on testing each functions, modules, or class (in Object Oriented Programming). This practice called unit testing which effective is extremely time consuming and labor intensive. Using the detail design description as guidance, important control parts are tested to uncover errors with the boundary of the module. This relative complexity of tests and errors detected as the result limited by the constrained scope established for unit tests. Unit testing is also referred to as module testing and is usually performed by the software developer. For *MhM*, unit testing was done during the implementation phase, in Flash itself. After the functionality of each module was developed, reviewed and verified, tests cases were designed. The module was tested to ensure that it operates correctly. Each module was tested individually.

6.3 Integration Testing

Testing is a specific feature together with the other newly development features is known as integration testing. Testing the interface of components explores how components explore how component interact with each other. Previously captured unit test scripts can be combined to create a variety of integration test cases, with minimum effort. For instance, units test scripts that tested on a Back function can be schedule with the Previous function to create an integration test on the entire system.

Incremental integration approach was applied during the development of this package. *MhM* was constructed and tested in small arguments in Flash Action Script, where errors were easier to isolate and corrected. Errors will be corrected before proceeding to the next integration.

Four approaches that can be used during this testing phase; (Pfleeger, 1998)

6.3.1 Bottom-up Integration

Most used approached for merging components to test the longer system. Using this method, each component at the lowest level of the system hierarchy. Is tested individually first.

Then, the next components to be tested are those that call the previously tested ones. These approaches are repeatedly until all components are included in the testing. The bottom-up is useful when many of the low-level components are general-purpose routines activities that are invoked often by others, when the system is integrating a large number of stand-alone reused components.

This approaches has been used in the integration testing where each module is tested without propagating the errors to other module. For example, the module for this system such as the game module and the main module is tested individually before being integrated as one system.

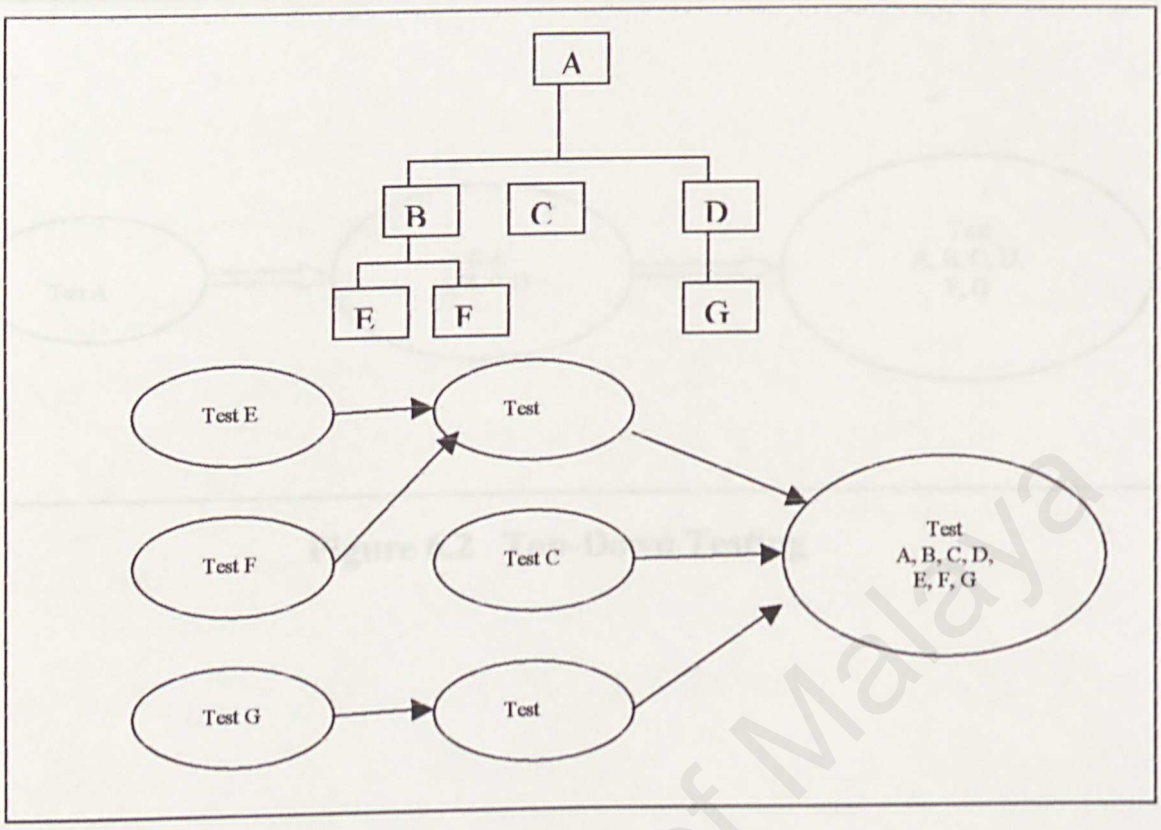


Figure 6.1 Bottom-up Testing

6.3.2 Top-Down Integration

This approach is the reverse of the bottom-up approach. In this method, the top level usually are controlling component, is tested by itself. Then all components called by the tested components are combined and tested by a larger unit. This approach is reapplied until all components are incorporated.

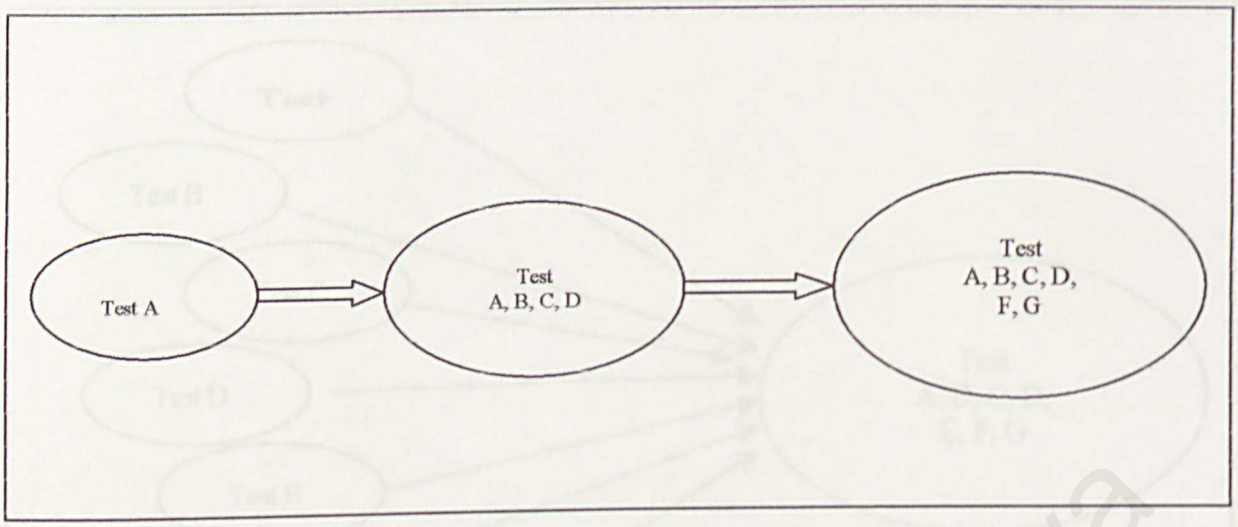


Figure 6.2 Top-Down Testing

6.3.3 Bing-Bang Integration

In this method, all the components are tested in isolation, and then they are all combined to test as a final system to see whether the system works. But, this method has several disadvantages and is not recommended for any system. One of the reasons is because all components are merged at once making it difficult to find the cause of any failure. Another reason is the interface cannot be distinguished easily from other types of faults.

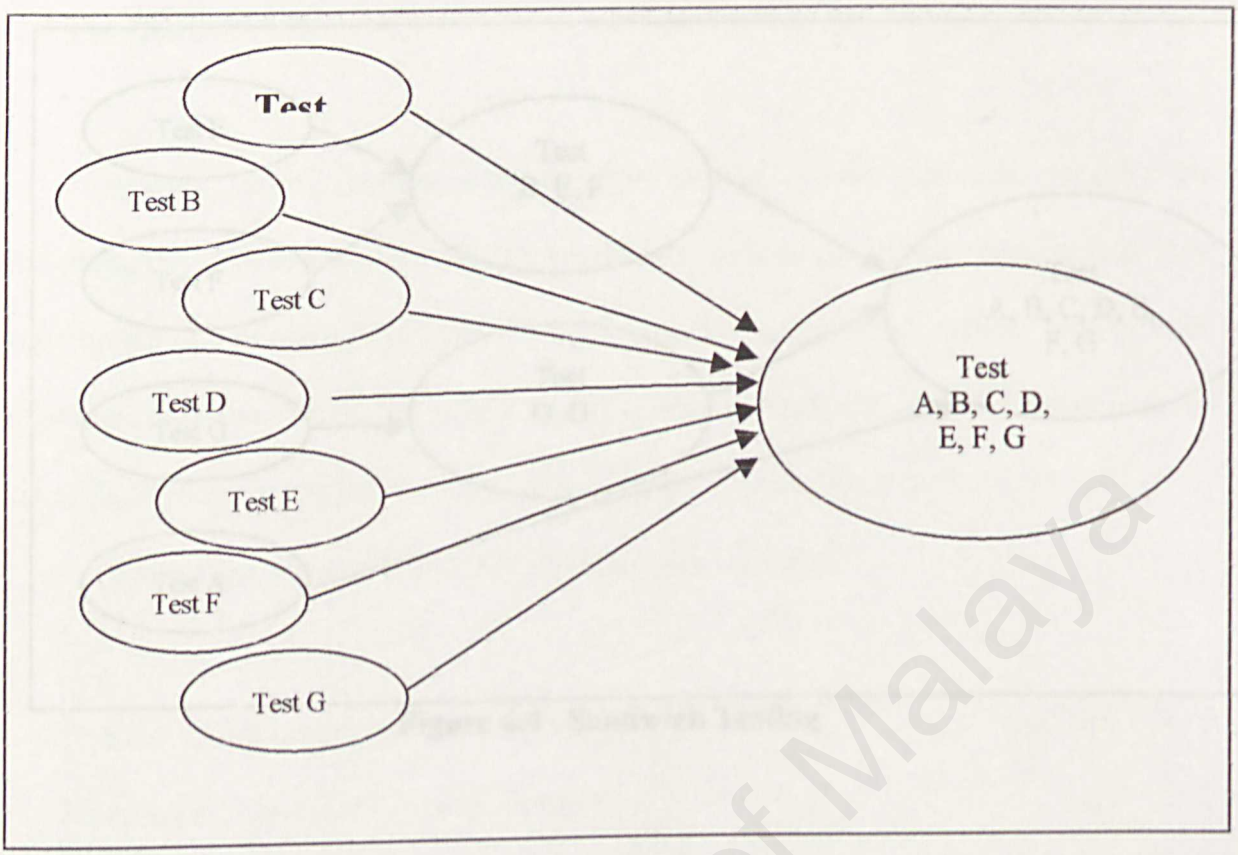


Figure 6.3 Bing-Bang Testing

6.3.4 Sandwich Testing

Sandwich testing approach is the combination of bottom-up and top-down strategy. The system is viewed as three layers just like a sandwich with the target layer in the middle, the levels above the target, and the levels below the target. A top-down approach is used in the top layer and a bottom-up one in the lower layer.

Sandwich testing allows integration testing to begin early in the testing process. It also combines the advantages of top-down with bottom-up by testing control and activities from the very beginning. However, it does not test the individual components thoroughly before integration.

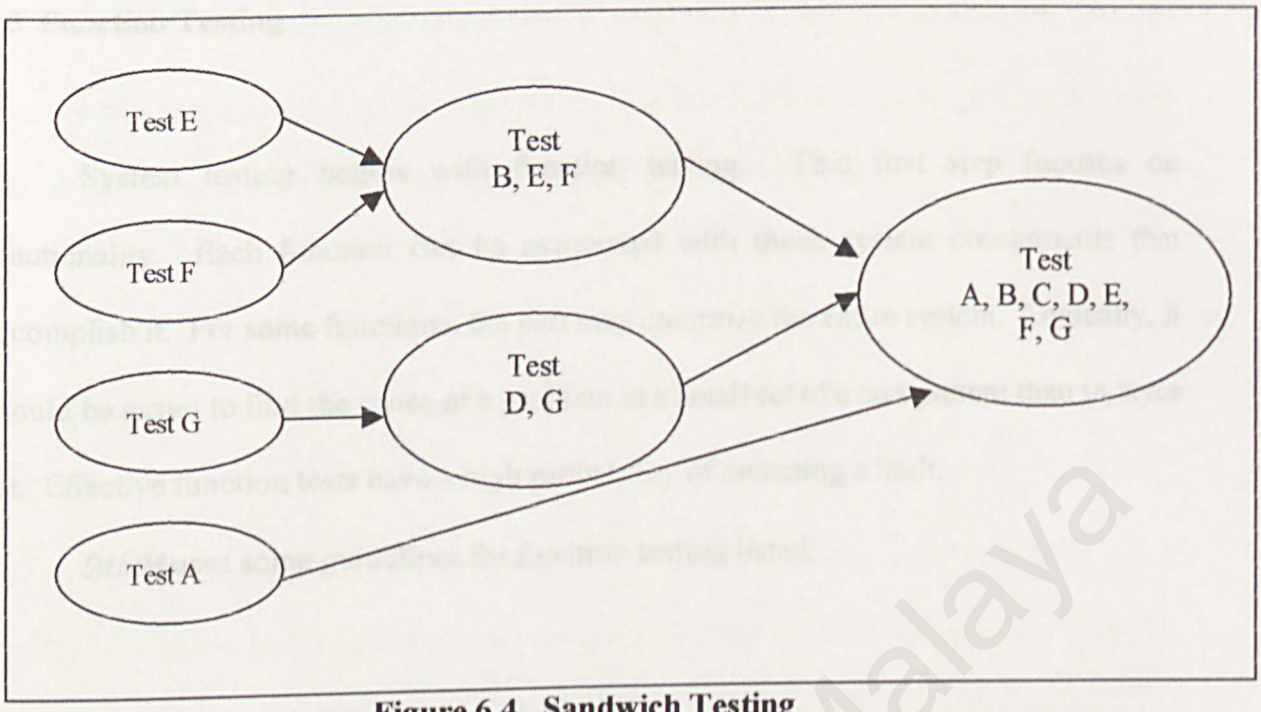


Figure 6.4 Sandwich Testing

6.4 System Testing

System testing is designed to reveal that cannot be attributed to individual component or to the interaction among components and other objects. System test studies all the common issues and behaviors that can only be exposed by testing the performance, stress, security, configuration, sensitivity, usability, data integrity, startup and recovery. System testing verifies that the overall ensures all objectives are achieved. There are several steps to test a system;

6.5 Function Testing

System testing begins with function testing. This first step focuses on functionality. Each function can be associated with those system components that accomplish it. For some functions, the part may comprise the entire system. Logically, it should be easier to find the cause of a problem in a small set of a component than in layer set. Effective function tests have a high probability of detecting a fault.

MhM uses some guidelines for function testing listed;

- have a high probability of detecting a fault
- know the expected action and output
- test both valid and invalid input
- never modify system just to make testing easier.
- have stopping criteria.

6.6 Performance Testing

When the system performs the functions required by the requirements, it turns to the way in which those functions were performed. The functional testing addresses the nonfunctional requirements. System performance is measured against the performance objectives set by the user as expressed in the nonfunctional requirements.

In *MhM,* performance tests examines how well the quizzes is done, the validity of the games response, the speed a response to the user commands, accuracy of the result and accessibility of the data checked against the user's performance.

6.7 Stress Test

This is to determine the program fulfills the requirements defined for it. It is equally important to ensure that the program works, as it showed under extreme conditions. In order to perform stress tests, execute the system in a manner that demands resources in abnormal, quantity, frequency, or volume.

6.8 Acceptance Test

As any user has not used the *MhM* thus there are no steps taken to pursue this cause. If there were to be, then maintenance of this package will involve the updating of each module to ensure the information is abreast with the revolving technology.

6.9 Chapter 6 Summary

System testing is required to ensure the system runs according to its specifications and in line with the users' requirement and expectation. There may be several reasons that cause software failure such as faults in the program design.

Testing phase is inclusive of three stages of testing, module testing, integration testing and system testing. Unit testing is the development activity that exercises each component separately. Integration testing puts components together in an organized way to help isolate faults as the combined components are tested together. Four approaches used in this stage of testing are Bottom-up Testing, Top-Down Testing, Bing-Bang Testing and Sandwich Testing.

This chapter describes many techniques that can be used to test code components individually and as they are integrated. It is important to understand the difference between a faults and a failure.

The goal of testing is to find faults and not to prove correctness. Indeed, the absence of faults does not guarantee correctness. There are many manual and automated techniques to assist faults finding in codes, as well as testing tools to know how much has been tested and to know when to stop testing.

Chapter 7

System Evaluation

CHAPTER 7: SYSTEM EVALUATION

7.1 Introduction

System evaluation is the process of identifying system's strength and limitation and possible enhancement of this project. System is evaluated to show the effectiveness and efficiency of what has been done so far. It also highlights on the knowledge gained and some of the problems faced while developing the system and steps taken to overcome them.

The evaluation techniques used are similar to those in other disciplines where measurement of key aspects of the products, processes, resources has to be taken and the information gathered can be used to determined whether the goals have been achieve. (Pfleeger, 1998)

7.2 Approaches to Evaluation

There are 4 approaches that can be used as an evaluation technique:

a) Feature Analysis

This is the simplest type of assessment used to rate and rank the attribute of various aspects. Feature analysis is necessarily very subjective and the ratings reflects the refers' biases.

b) Survey

A survey is a retrospective study to try to document relationships and outcomes in a given situation. Surveys are often done in the social sciences where attitude are pooled to determine how a population feels about a particular set of issues. In this program, surveys are conducted to record data to determine how the user reacted to particular method, tool or technique. The surveys conducted are attached in the appendix.

c) Case Study

In a case study, key factors that may affect an activity's outcome are identified and then they are documented

d) *Formal Experiment*

In a formal experiment, values of independent variables are manipulated, and changes in dependent variables are being observed to determine how the changes in the input affect changes in the output.

7.3 Problems Encountered and Solution

Throughout the development of *MhM* learning package, several problems were encountered. Below is the list of the problems along with the approaches and solutions taken, separated into two sections;

7.3.1 Problems and Solutions Encountered During Project Studies and Analysis

MhM is the multimedia project, which requires the use of all multimedia elements such as images, graphics, audio, animation and text integrated in it.

Problems

- The major problems faced during project studies and analyzing is choosing the most suitable software for developing this project
- Choosing the appropriate development life cycle model and methodology.
- Finding facts and methods of application with regards to the design of the project either logically or physically and technically.

Solutions

- Retrieve information from the Internet and make a through analysis with regards to the mentioned problems.
- Reaching up on relevant materials i.e. books, journals and etc. and try to understand them.
- Referring to the previous projects that were done in the Document Room of FSKTM.
- Supervisor and course mates advices and guidance.

7.3.2 Problems and Solutions Encountered During Project Implementation and Testing

Problems

- Learning to use Macromedia Flash MX, Director MX, and other software such as Sonic Foundry Sound Forge, Adobe Photoshop etc.
- Choosing the most appropriate images and icons for the interface.
- Integrating and testing the entire system on another computer.

Solutions

- Viewing samples and the Help menu to understand how to use the software better.
- Viewing other projects done previously and reviewing the requirements regarding the principals of HCI in designing interfaces.
- Viewing the tool tips and the Help menu found in Flash MX.
- When testing is done on another computer, some of the features or links cannot be presented properly. Therefore, steps such as testing on other computer a couple of times were carried out.

7.3.3 Problems and Solutions Encountered with the Hardware Limitation

Problems

This package is developed using a computer with 32 MB RAM and 3.2 GB of hard disk space which is quite inefficient to develop a multimedia program that uses a lot of memory space with all the sound and images imported, the speed gradually becomes very slow. It is quite frustrating experience to deal with but there are no other options.

Solutions

The only solution to this is to keep the files small and minimize the amount of memory speed as much as I can. For example, where possible the sprites dragged into the score are kept short because the longer the score, the more memory it takes to download.

7.4 Evaluation by End users

Through questionnaires that are a special-purpose documents that allow the analyst to collect information and opinion from respondents. The document can be mass-produced and distributed to respondents who can then complete the questionnaire on their own time.

These questionnaires are motivated in order to obtain the user views on the use of *MfM* educational software in learning. I have allowed 15 users to use the software and get response and feedback after using *MfM*. Those people are potential users of this software. The enclosure of the questionnaire has been attached at the appendix section. Here are the questionnaire analyses from user's feedback on *MfM* software.

7.4.1 Questionnaire Analysis (Part 2 Questionnaire Set)

7.4.1.1 Feedback from Question 1:

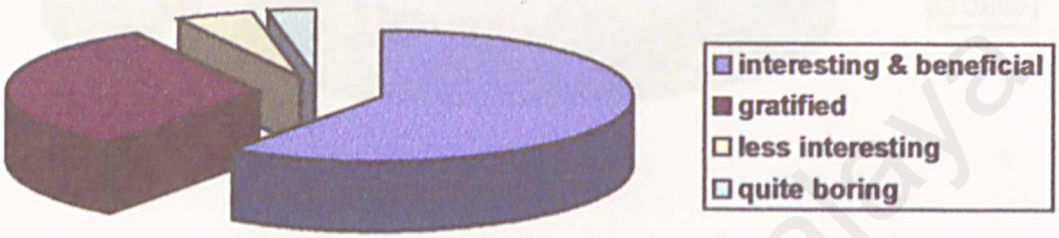


Figure 7.1 Pie chart for Questionnaire Feedback from Question 1

As presented in Figure 7.1, based on feedback from question number 1, 60% of the respondents claim that they find learning using *MhM* are interesting and benificial. 33% of them gratified with the package. While 5% of them claim that it was less interesting. The rest of them (2%) claim that the software are quite boring. It can be said that using *MhM* interactive educational software in learning will attract user interest.

7.4.1.2 Feedback from Question 2:

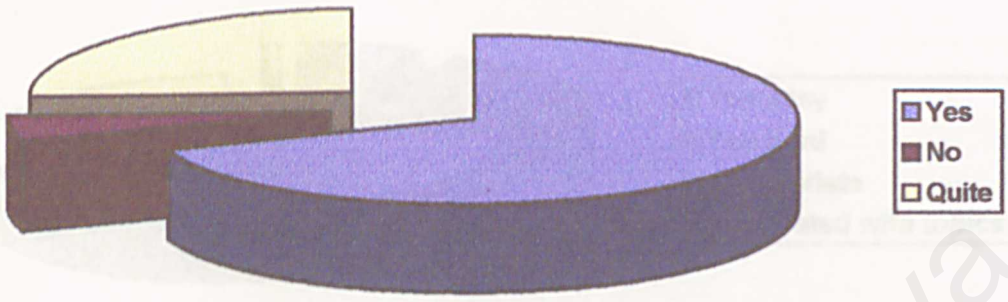


Figure 7.2 Pie chart for Questionnaire Feedback from Question 2

As presented in Figure 7.2, based on feedback from question number 2, 70% of the respondents indicated that they find *MhM* educational software is easy to use and implement . While 5% of them claim that it was not easy to implement. The rest of them (25%) claim that it was quite easy to implement. This clearly shows that *MhM* was developed to suitably adapted by all kind of users.

7.4.1.3 Feedback from Question 3:

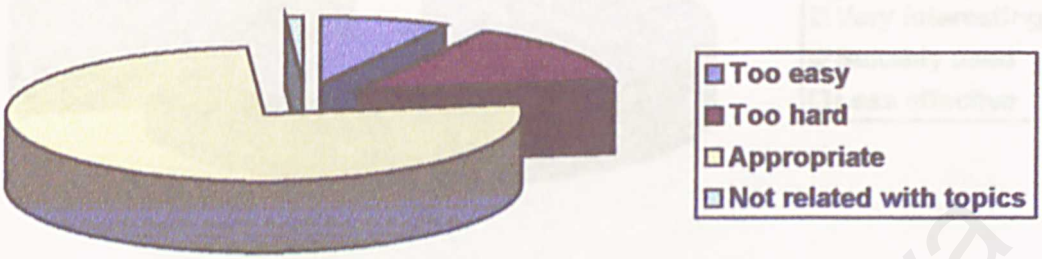


Figure 7.3 Pie chart for Questionnaire Feedback from Question 3

As presented in Figure 7.3, based on feedback from question number 3, 76% of the respondents' claims that the provided quizzes questions are appropriate. 15% of them claim that it was too hard to solve. While 8% of them claim that it was less too easy to solve. The rest of them (1%) claim that the provided quizzes questions are not related to the topics. It can be said that the provided quizzes questions in *MfM* are quite suitable and it wasn't impossible to be solve by any kind of user.

7.4.1.4 Feedback from Question 4:

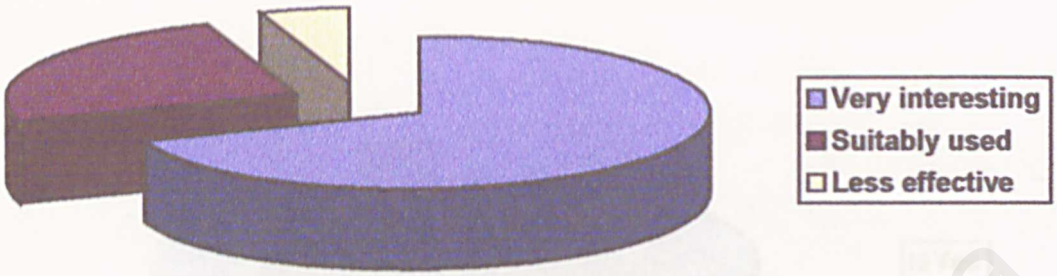


Figure 7.4 Pie chart for Questionnaire Feedback from Question 4

As presented in Figure 7.4, based on feedback from question number 4, 70% of the respondents indicated that they find that the represent graphics, pictures and audio effects in *MfM* educational software are very interesting. While 25% of them claim that it was suitably used. The rest of them (5%) claim that it was quite less effective to users. This clearly shows that *MfM* was developed to suitably adapt and to be appealing to all kind of users.

7.4.1.5 Feedback from Question 5:

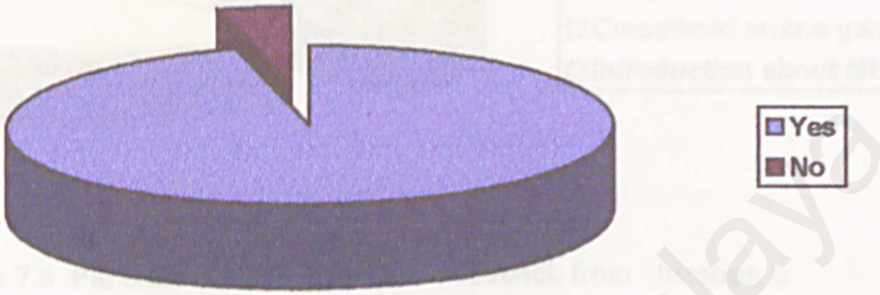


Figure 7.5 Pie chart for Questionnaire Feedback from Question 5

As presented in Figure 7.5, based on feedback from question number 5, 96% of the respondents claim that they like to implement *MhM* package as learning tool. The rest of them (4%) denied the statements. It can be said that *MhM* educational software have the ability to attract users with the appealing features besides all those multimedia elements.

7.4.1.6 Feedback from Question 6:

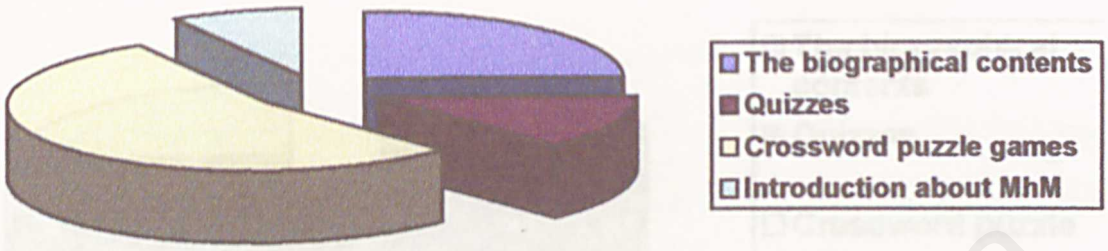


Figure 7.6 Pie chart for Questionnaire Feedback from Question 6

As presented in Figure 7.6, based on feedback from question number 6, 54% of the respondents mostly preferred the crossword puzzles part as their favorites. 25% of the respondents indicated that they find that the biographical contents are the part they most attracted to. While 13% of them chose quizzes section. The rest of them (8%) claim that it the introduction about *MhM* as their favorites. Thus, this clearly shows that each part of *MhM* part may attract different kind of users. Furthermore, *MhM* was developed to suitably adapt and to be appealing to all kind of users.

7.4.1.7 Feedback from Question 7:

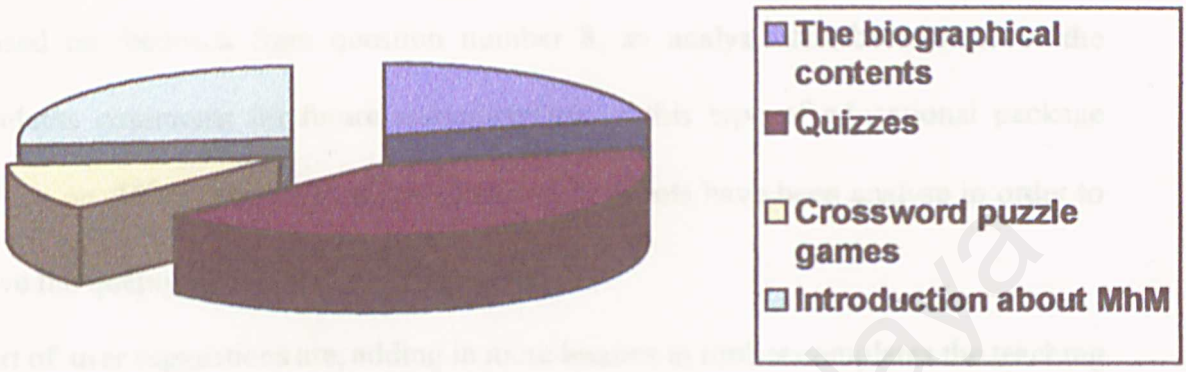


Figure 7.7 Pie chart for Questionnaire Feedback from Question 7

As presented in Figure 7.7, based on feedback from question number 7, 42% of the respondents claim that they think the quizzes section were less attractive to most users. 25% of the respondents indicated that they find that the introduction about *MhM* were less attractive to most users. . While 8% of them chose the biographical contents. The rest of them (11%) chose crossword puzzles part as the less attractive part. It can be said that the less attractive part to most users should be enhance and enriched with various kind of interactive features to increase user interest and understandability in the future.

7.4.1.8 Feedback from Question 8:

Based on feedback from question number 8, an analysis has been made to the respondents comments for future enhancements of this type of educational package especially on *MhM*. All those given valuable comments have been analyse in order to improve the quality of this educational software.

Part of user suggestions are; adding in more lessons to further completes the teaching and learning materials beside enhance the learning capability of this educational software, enabling the installation of the *MhM* educational package, the software will allow user to save the quiz if they cannot complete in time and continue later where they left off, provide Malay language package to attract more users (bilingual package), add more interactivity on all the modules, etc.

Thus, the comments have been adapted as this software future enhancement and being list out in the '*7.6 Future Enhancement*' part in this '*Evaluation*' chapter.

7.4 System Strengths

Malaysia History Makers –*MhM* educational package has several features of quality listed below:

- Attractive and interactive user interface, which are not too overwhelming for beginners.
- Easy to follow links and navigation through the creation of meaningful and recognizable icons and buttons.
- Audio narration to increase understandability of the particular component.
- User friendliness of the system, which is, design based on Graphical User Interface (GUI). The user interfaces are predictable in order for the user to get use to the entire system in a short time and thus gaining confidence in the system.
- Language used- English language used in the software will wide the user's scope that includes foreigners who do not understand Malay language.
- Windows platform; since windows is the most popular and commonly used operating system in Malaysia even though the number of Macintosh users is growing. This package is developing to operate on Windows platform thus; it can be easily adapted to most PC's.
- The game module is an added attraction and acts as a brainteaser for users.

7.5 System Constraints

- Low quality voice and audio- qualities of the voices recorded are quite low compared to audio CD. This is because the voice are not recorded in a sound proof studio which make the sound quite noisy in the background. The audio through the software are recorded in lower sample rate which make the quality not as good as the original sound.

- Slow loading speed – the loading process is quite slow since it is developing using a PC with 48 MB of RAM. If this package is used with less memory than that, it could be slower which is not very pleasing.

- Cannot be installed, therefore user need the CD-ROM every time they want to view this software

- The users performance in the quizzes cannot be tracked.

7.6 Future Enhancements

This package could be enhanced in order to give the best to the users. There are a lot of aspects which can be improved, and to make it more interesting, more modules can be added to the package. To enhance the software performance in the future, many aspects and features have to be considered as part of the enhancement. They are:

- Adding in more lessons to further completes the teaching and learning materials beside enhance the learning capability of this educational software.
- Enabling the installation of the *MhM* educational package.
- The software will allow user to save the quiz if they cannot complete in time and continue later where they left off.
- Provide Malay language package to attract more users (bilingual package).
- Add more interactivity on all the modules.
- Provide a hint button during quizzes to help student instead of having them go to the lessons for help and tips in answering the quizzes and games.
- Add more activities, which can develop user's mind such as IQ test and keep their score in the database so that they can check on their progress.

7.7 Knowledge and Experienced Gained

Throughout this project, I have learned so much from the very beginning until the completion of this project. Learning itself is an on-going process. Everyday, I discovered new things and with new problems faced each day, it helps me find the solution and from every mistake, there will be lessons learned from it.

This is a very good experience and also great challenges, having to know and discover new things on my own, and also in a very short time. It helps built self-confidence and thought me a lot about time-management and self-discipline as well as being independent when I have to deal with difficulties.

Throughout the development of this project, I have learned about Flash MX, also other editing tools such as Photoshop, SoundForge, etc. It gives me chance to learn ActionScript, which is a very powerful scripting language of Macromedia Flash MX. Flash requires me to use both logic and imagination at the same time. It is a great tool for creating software. With Flash, I can quickly bring my ideas into life because it is an environment that inspires new ideas as we explore it.

To start on a project, everything has to be planned ahead from deciding what software to use to test and maintain the system after it is completed. By documenting every step, it has trained me on how to plan a project and learn how to allocate the time needed properly with proper documentation, all the things planned are made clear and my work is more organize.

To gather all the information needed, through research has been done through books, internet, library, and other sources which help me develop my skills in finding the most appropriate information and data. All the time spent developing the package was not an easy task. It helps me learn on how to cope with stress when deadlines are getting closer. With the support from my lecturer, family, and friends, all these challenges can be overcome.

Flash MX also comes with full-featured on-line help application, which is very useful tool. The online help is the quickest way for me to find out the details of the feature other than referring books. I find the Flash Help files to be very informative, helpful and comprehensive.

In addition, a lot of information is available at Macromedia's website. It has a Tech Notes section that includes a variety of helpful tips and tricks. Whenever I have a problem on certain area in Flash, this is the place I turned to and they are very helpful in answering whatever problems I was facing

7.8 Chapter 7 Summary

Chapter 7 is the part where evaluation on the completed system is made on the system's strength and limitation. The first part of the chapter explains about all the problems faced during the development of the phase. The problems are followed by the solutions on how to overcome the problems; the problems could arise from hardware, ActionScript in Flash and external aspects such as lack of resources.

The system is later being evaluated on the limitation and constraints. Future enhancement is the part where suggestions and new idea are put together as the first step ahead to improve what has been done. The experience and knowledge gained throughout the development of the system and later determined.

Conclusion

7.9 Conclusion

MhM has been successful in attaining its primary objectives which was to produce a piece of software which would transform an exists topic currently, taking place in our daily life or from a book, and 'bring it to life' by designing a multimedia CD-ROM based learning package to hold the same info as part of the book selected.

As the interactive multimedia enters the mainstream as an educational medium it is important that the teachers grab the opportunity to exposed themselves to the new technology of learning since interactive multimedia have been proven as a powerful learning and teaching tool because it engages multiple senses. This system was found to be user friendly, easily understood and effective, which will make the teaching and learning process more attractive and efficient.

However, some minor drawbacks still exist in the system as discussed in the system limitation section where installation is unable, non-existing search function and lack of performance tracking. These features are intended to be embedded in the system itself for future enhancement. Developing a multimedia application package is a challenging task especially when concerning the user interface and audio because it has to be pleasant to the user's eyes and in sync with the flow of the narration, therefore careful steps has been taken to achieve the desired requirements.

Throughout this project, a lot of experienced has been gained, new knowledge has been acquired and most importantly, there has been an improvement in project management. Having up to date knowledge and information becomes important in keeping abreast with the fast and ever changing fields in the information edge. This project enables in the implementation of the software engineering approach to be applied in the development of this package.

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http://www.smpke.jpm.my/prime%20minister/pm-main.htm

Appendix

QUESTIONNAIRE (Part 1)

These questionnaires are motivated in order to obtain the user views on the use of educational software in learning. Respondents may thick and select their preferred choice for each question given.

1. Have you ever used CD_ROM learning package as a learning tool before?

   ☐ Yes ☐ No

2. Did you find that learning using interactive educational software somewhat fun and interesting?

   ☐ Yes ☐ No ☐ Perhaps

3. Did every computer in your school have Internet connection?

   ☐ Yes ☐ No ☐ Just a few

4. How frequent did you used educational software in learning each week?

- ☐ No software for use
- ☐ Less than 1 hour
- ☐ 1 to 5 hours
- ☐ 5 to 10 hours
- ☐ More than 10 hours

5. From your point of view, what do you think of educational software importance in education?

- ☐ Important
- ☐ Somewhat important
- ☐ Unimportant
- ☐ Neither

6. How did you get the information about the software you used? (you may choose more than one)

- ☐ Read about it
- ☐ Heard about it
- ☐ Received information
- ☐ Actually tried it
- ☐ Saw it displayed

7. Do you think learning history by using CD-ROM will really helps students?

☐ Yes ☐ No ☐ Perhaps

8. Have you ever find CD-ROM package based on history specifically on local contents?

☐ Yes ☐ No

9. Are you interested in knowing more about our country history makers?

☐ Yes ☐ No ☐ Perhaps

10. What do you think are the barriers in using educational software in school? (you may choose more than one)

☐ Not enough computer equipment

☐ Lack of funds for software

☐ Lack of funds for equipment

☐ No time to integrate

Your cooperation is very much appreciated. Thank you.

Mazlina Mustafa Kamal
FSKTM, University Malaya
2003…..

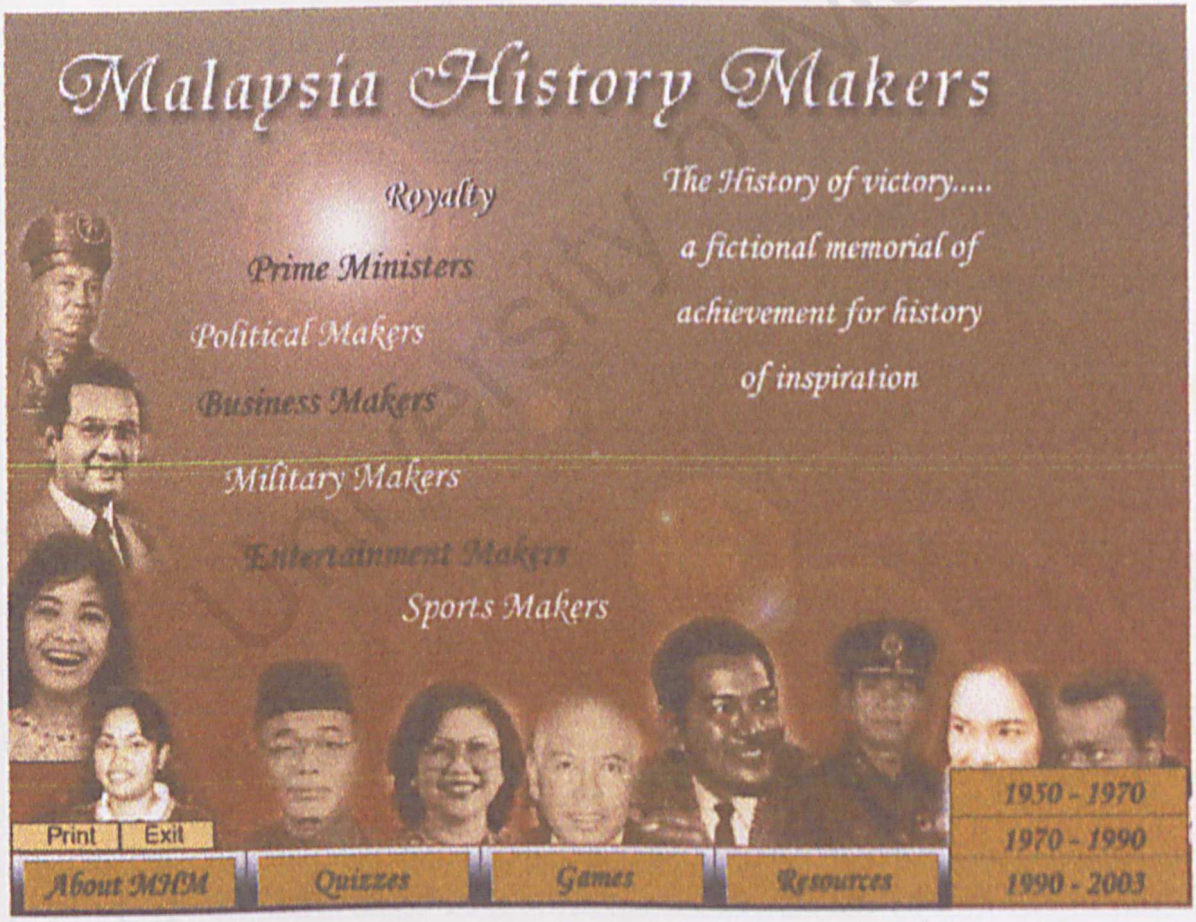
QUESTIONNAIRE (Part 2)

~ Evaluation by End Users ~

These questionnaires are motivated in order to obtain the user views on the use of Malaysia History Makers Software – *MhM* in learning. Respondents may thick and select their preferred choice for each question given.

Purpose: *Testing on end users,*

Based on :



1. After using *MhM* educational software, you found it……

- ☐ Interesting and beneficial
- ☐ Gratified
- ☐ Less interesting
- ☐ Quite boring

2. Is it easy for you to implement the *MhM* software?

- ☐ Yes
- ☐ No
- ☐ Quite

3. The provided quizzes questions are……

- ☐ Too easy
- ☐ Too hard
- ☐ Appropriate
- ☐ Not related with topics

4. The represent graphics, pictures and audio effects are……..

- ☐ Very interesting
- ☐ Suitably used
- ☐ Less effective

5. Do you like to implement *MhM* package as learning tool?

- ☐ Yes
- ☐ No

6. Which part does you most attracted?

- ☐ The biographical contents
- ☐ Quizzes
- ☐ Crossword puzzle games
- ☐ Introduction about *MhM*

7. Which part do you think less attractive to most users?

- ☐ The biographical contents
- ☐ Quizzes
- ☐ Crossword puzzle games
- ☐ Introduction about *MhM*

8. Other comments for future enhancements of this type of educational package especially on *MhM*

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Your cooperation is very much appreciated. Thank you.

Mazlina Mustafa Kamal
FSKTM, University Malaya
2003…..

Analysis of Questionnaire

QUESTIONNAIRE (Part 1)

These questionnaires are motivated in order to obtain the user views on the use of educational software in learning.

As presented in Figure 3.2 in page 42 , based on feedback from question number 2, 63.3 % of the respondents claim that they find learning by using educational software somewhat fun and interesting. While 3.3% denied that statements. The rest of them (33.3%) claim that perhaps the software are somewhat fun and interesting. I can be said that using interactive educational software in learning might attract user interest.

As presented in Figure 3.3 in page 43, based on feedback from question number 3, 100% of the respondents indicated that there are only a few computers with Internet connection in their school. Based on this condition, this software was planned to be developed through CD-ROM as the media, not web based learning package. This will give advantages to user who's not connected with the Internet.

As presented in Figure 3.4 in page 44, based on feedback from question number 10, majority (22 respondents) of the respondents chose that they have no time to integrate with the use of educational software in school. Perhaps, they have to cover a lot of subject during school time, that led to this scenario. Other barriers are indicated as not enough computer equipment, lack of funds for software and lack of funds for equipment.

Analysis of Questionnaire

QUESTIONNAIRE (Part 2)

~ Evaluation by End Users ~

These questionnaires are motivated in order to obtain the user views on the use of Malaysia History Makers Software – *MhM* in learning.

Purpose: *Testing on end users,*

As presented in Figure 7.1 in page 88, based on feedback from question number 1, 60% of the respondents' claims that they find learning using MhM are interesting and beneficial. 33% of them gratified with the package. While 5% of them claim that it was less interesting. The rest of them (2%) claim that the software are quite boring. It can be said that using *MhM* interactive educational software in learning will attract user interest.

As presented in Figure 7.2 in page 89, based on feedback from question number 2, 70% of the respondents indicated that they find *MhM* educational software is easy to use and implement . While 5% of them claim that it was not easy to implement. The rest of them (25%) claim that it was quite easy to implement. This clearly shows that *MhM* was developed to suitably adapted by all kind of users.

As presented in Figure 7.3 in page 90, based on feedback from question number 3, 76% of the respondents' claims that the provided quizzes questions are appropriate. 15% of them claim that it was too hard to solve. While 8% of them claim that it was less too easy to solve. The rest of them (1%) claim that the provided quizzes questions are

not related to the topics. It can be said that the provided quizzes questions in *MhM* are quite suitable and it wasn't impossible to be solve by any kind of user.

As presented in Figure 7.4 in page 91, based on feedback from question number 4, 70% of the respondents indicated that they find that the represent graphics, pictures and audio effects in *MhM* educational software are very interesting. While 25% of them claim that it was suitably used. The rest of them (5%) claim that it was quite less effective to users. This clearly shows that *MhM* was developed to suitably adapt and to be appealing to all kind of users.

As presented in Figure 7.5 in page 92, based on feedback from question number 5, 96% of the respondents claim that they like to implement *MhM* package as learning tool. The rest of them (4%) denied the statements. It can be said that *MhM* educational software have the ability to attract users with the appealing features besides all those multimedia elements.

As presented in Figure 7.6 in page 93, based on feedback from question number 6, 54% of the respondents mostly preferred the crossword puzzles part as their favorites. 25% of the respondents indicated that they find that the biographical contents are the part they most attracted to. While 13% of them chose quizzes section. The rest of them (8%) claim that it the introduction about *MhM* as their favorites. Thus, this clearly shows that each part of *MhM* part may attract different kind of users. Furthermore, *MhM* was developed to suitably adapt and to be appealing to all kind of users.

As presented in Figure 7.7 in page 94, based on feedback from question number 7, 42% of the respondents claim that they think the quizzes section were less attractive to most users. 25% of the respondents indicated that they find that the introduction about

MhM were less attractive to most users. While 8% of them chose the biographical contents. The rest of them (11%) chose crossword puzzles part as the less attractive part. It can be said that the less attractive part to most users should be enhance and enriched with various kind of interactive features to increase user interest and understandability in the future.

Based on feedback from question number 8, an analysis has been made to the respondents comments for future enhancements of this type of educational package especially on *MhM*. All those given valuable comments have been analyse in order to improve the quality of this educational software.

Part of user suggestions are; adding in more lessons to further completes the teaching and learning materials beside enhance the learning capability of this educational software, enabling the installation of the *MhM* educational package, the software will allow user to save the quiz if they cannot complete in time and continue later where they left off, provide Malay language package to attract more users (bilingual package), add more interactivity on all the modules, etc.

Thus, the comments have been adapted as this software future enhancement and being list out in the '*7.6 Future Enhancement*' part in the '*Evaluation*' chapter in page 98.

User Manual

~ USER MANUAL ~

TABLE OF CONTENTS

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LIST OF FIGURES / TABLE

Figures

Table

INTRODUCTION

Whenever we bought a product specifically a software package, usually it will enclosed the user manual. For MhM educational software, this user manual is required to give full understanding on how this software functioning and especially for first time user. So that, the user won't hesitate and confused with what they done when using the so

Part 1: Hardware and Software Requirements

Hardware Requirements

Listed below are the hardware requirements for MhM:

- PC with 133 MHz Processor or higher (Intel Pentium Processor recommended)
- Minimum 16 MB RAM (32 recommended)
- CD-ROM drive 16X or higher
- mouse

Software Requirements

The software requirements needed to run this package are:

- Microsoft Windows 98 or higher

Part 2: Getting Started

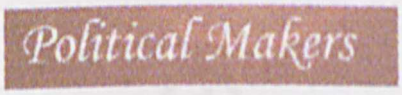
1. Insert the CD into your CD-ROM drive
2. wait until *MhM* appear on your desktop. This is an auto-run CD-ROM
3. If nothing happen,select your CD-ROM drive in Windows Explorer or My Computer icon
4. Click on the file **MhM.exe** to start the program.
5. No installation is necessary to use *MhM* package.

Part 3: Navigation Through the System.

Navigation through the package is fairly simple. At each main screen, (main interface, about *MhM*, quizzes, games) the objects on the screen are interactive and clicking on them may bring you to another screen.

Even so, buttons are also provided at the bottom of every screen for navigating purpose. This package is required to have good and efficient interfaces in order for used to browse easily. This package uses the Graphical user interface application approach for better visual effects to the end users. The usage of meaningful captions and icons will help users to use this package confidently with a minimum duration.

These are the buttons used in this software and its meaning:

No.	Button	Meaning
1.		To know what the software provides and offered
2.		To solve the quizzes question provided about the history makers
3.		To solve crossword puzzle game related to the history makers contents.
4.		List out authorized resources where the information was retrieved
5.		List out the history makers by name after selecting their category
6.		The timeframe that divided all the makers by the years they were in
7.		Go to all Malaysia past and present Yang Di Pertuan Agong
8.		Go to all Malaysia past and present Prime Ministers
9.		Go to all Malaysia past and present Political Makers
10.		Go to all Malaysia past and present Business Makers

11.	Military Makers	Go to all Malaysia past and present Militiry Makers
12.	Entertainment Makers	Go to all Malaysia past and present Entertainment Makers
13.	Sports Makers	Go to all Malaysia past and present Sports Makers
14.	Print	To print selected pages in *MhM*
15.	Exit	To exit from *MhM*
16.	Answer	To get the full solution for crossword puzzle
17.	Try Again	To try again to solve the crossword puzzle
18.		Go to the next page in the history makers section
19.		Go to the previous page in the history makers section
20.		Go to the next page in the quizzes section
21.		Go to the previous page in the quizzes section

Table 8.1 : Navigation and functional buttons in *MhM* educational software

Part 4: Into *MhM*

The main page consist of:

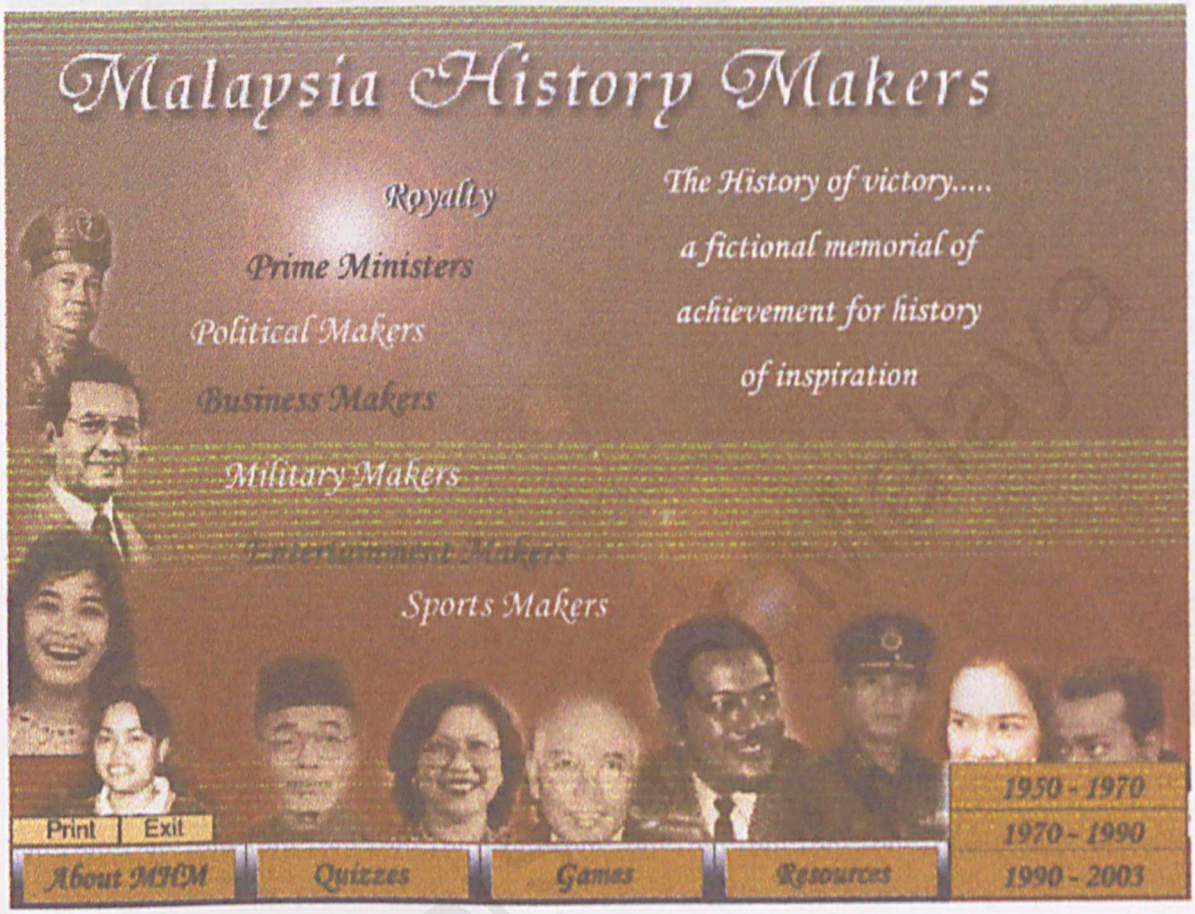


Figure 8.1: *MhM* - Malaysia History Makers Educational Software Main Page

This is Malaysia History Makers main page. The main page mostly consist of the main menus that user may access most of section through the software. From here, user may go to the main contents about the history maker by clicking the navigation text that consists of *Royalty, Prime Ministers, Political Makers, Business Makers, Military Makers, Entertainment Makers and Sports Makers*. Users also may go to the other part of the software such as *About MhM, Quizzes, Games, Resources* and the history makers divided by the time frame at the bottom at the left side of the main page.

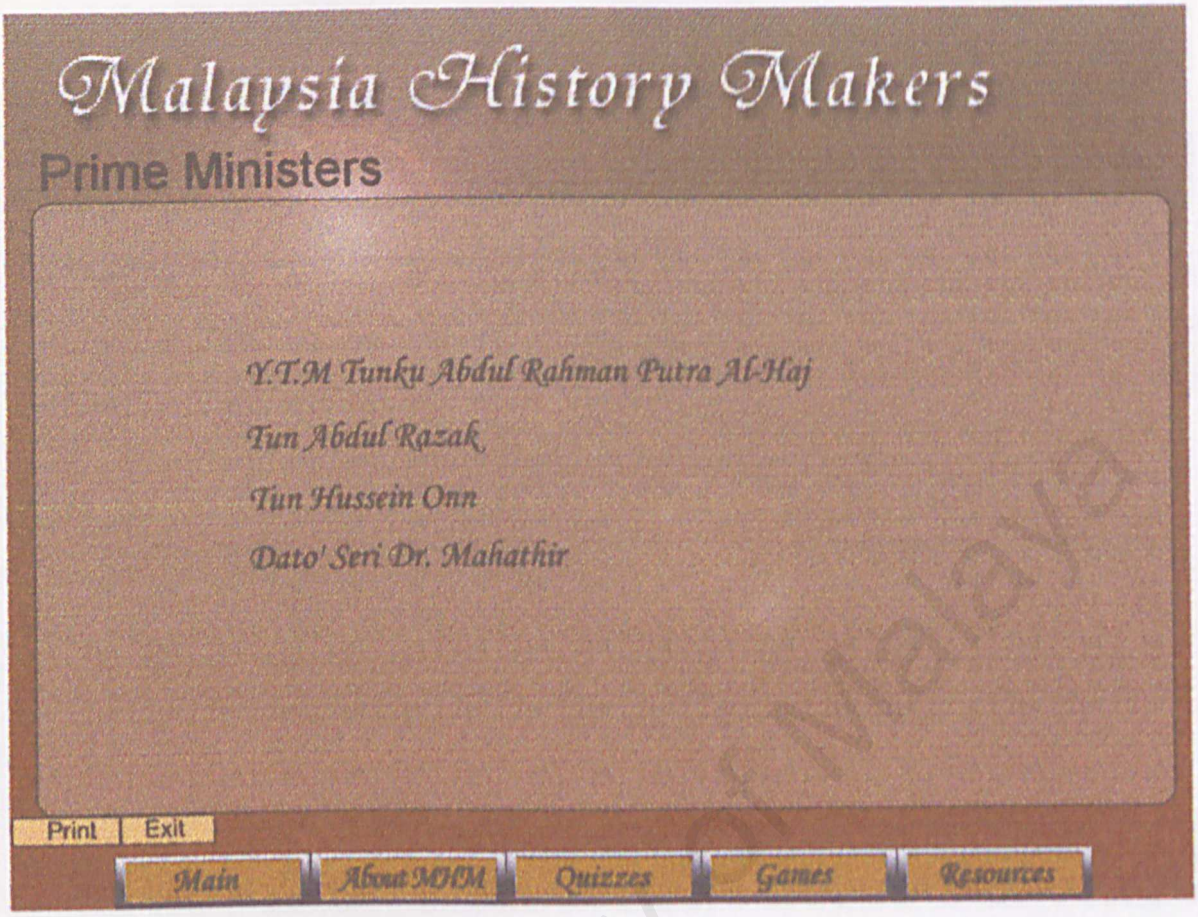


Figure 8.2: *MhM* – list of history makers selected by category

This screen appears when you click *Prime Ministers* from the main page. From this part, user may choose which history makers they would like to go for. For Prime Ministers, currently, Malaysia only have four prime ministers from the past and present. So, if the user would like to know about the first Prime Minister, just click to text " *Y.T.M Tunku Abdul Rahman Putra Al-Haj*. Then, the biographical information about him will appear. From here, user may also exit from the software and print the selected page.

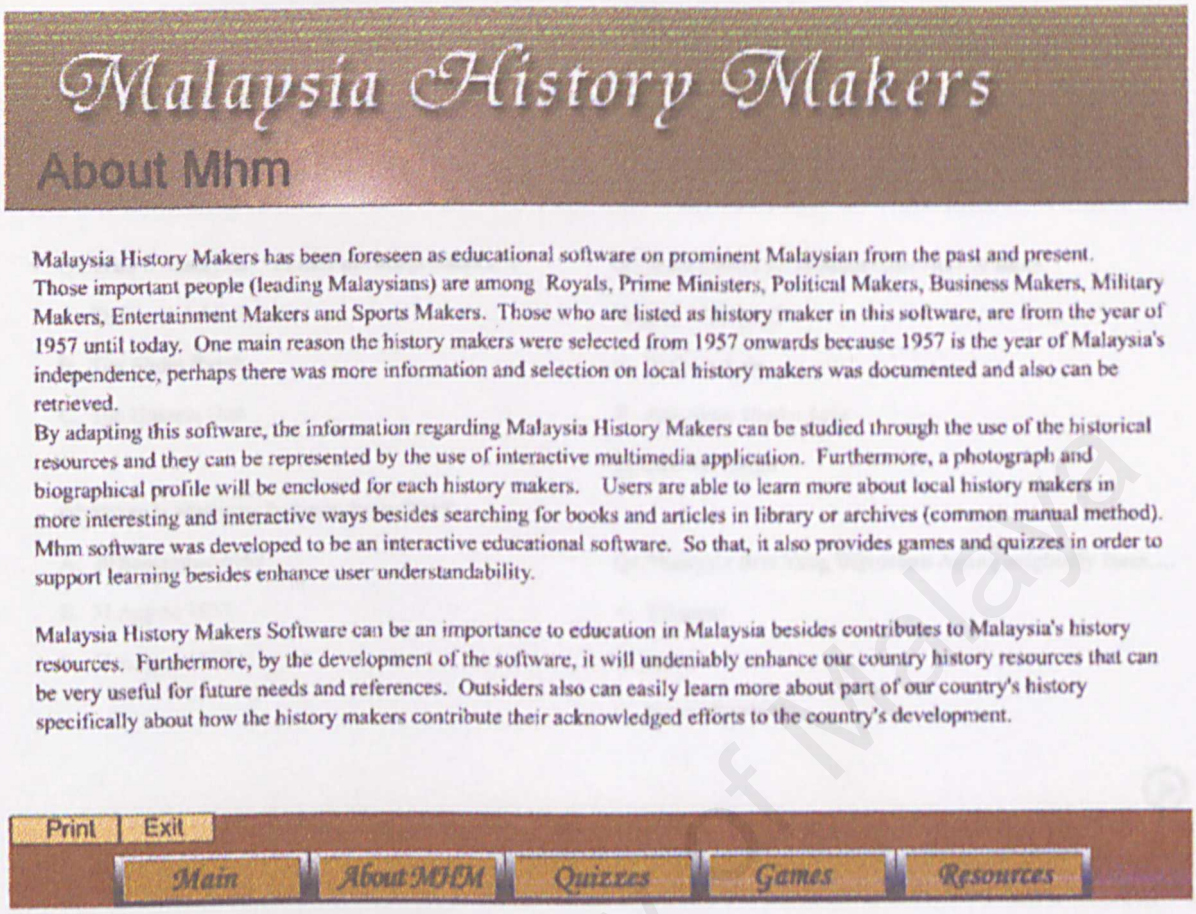


Figure 8.3: *MhM* – elaborates what the software provided and offered

This screen appears when you click *About MhM* button from any part of the software. From this part, it will describe to users what this educational software is all about. User may read the text and listen to the audio narration describing about this software. From here, user may also exit from the software and print the selected page.

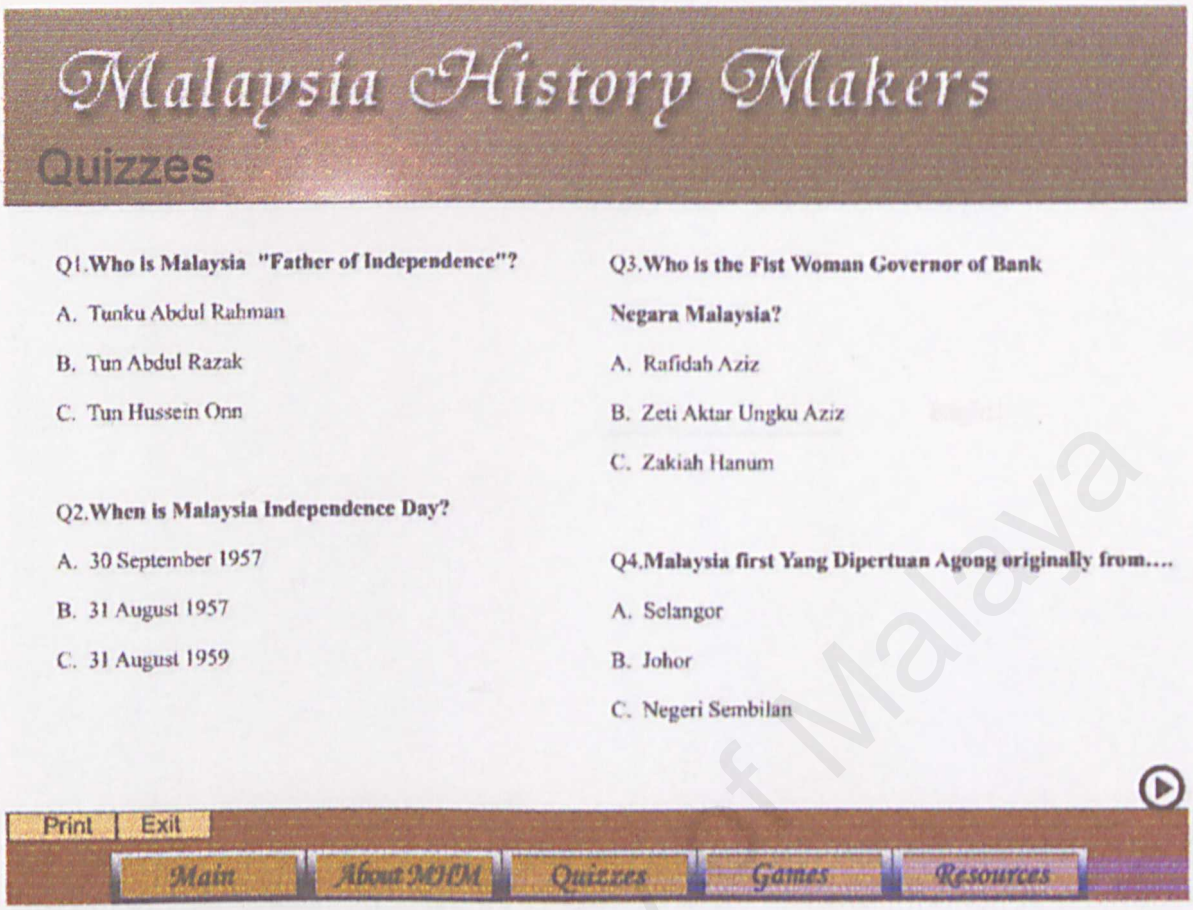


Figure 8.4: *MhM* – quizzes section about the history makers

This screen appears when you click *Quizzes* button from any part of the software. An audio command will follow in order to let user know what they have to do. From this part, each page there are four questions. Users may go to the next page for the rest of the questions provided. From here, user may also exit from the software and print the selected page.

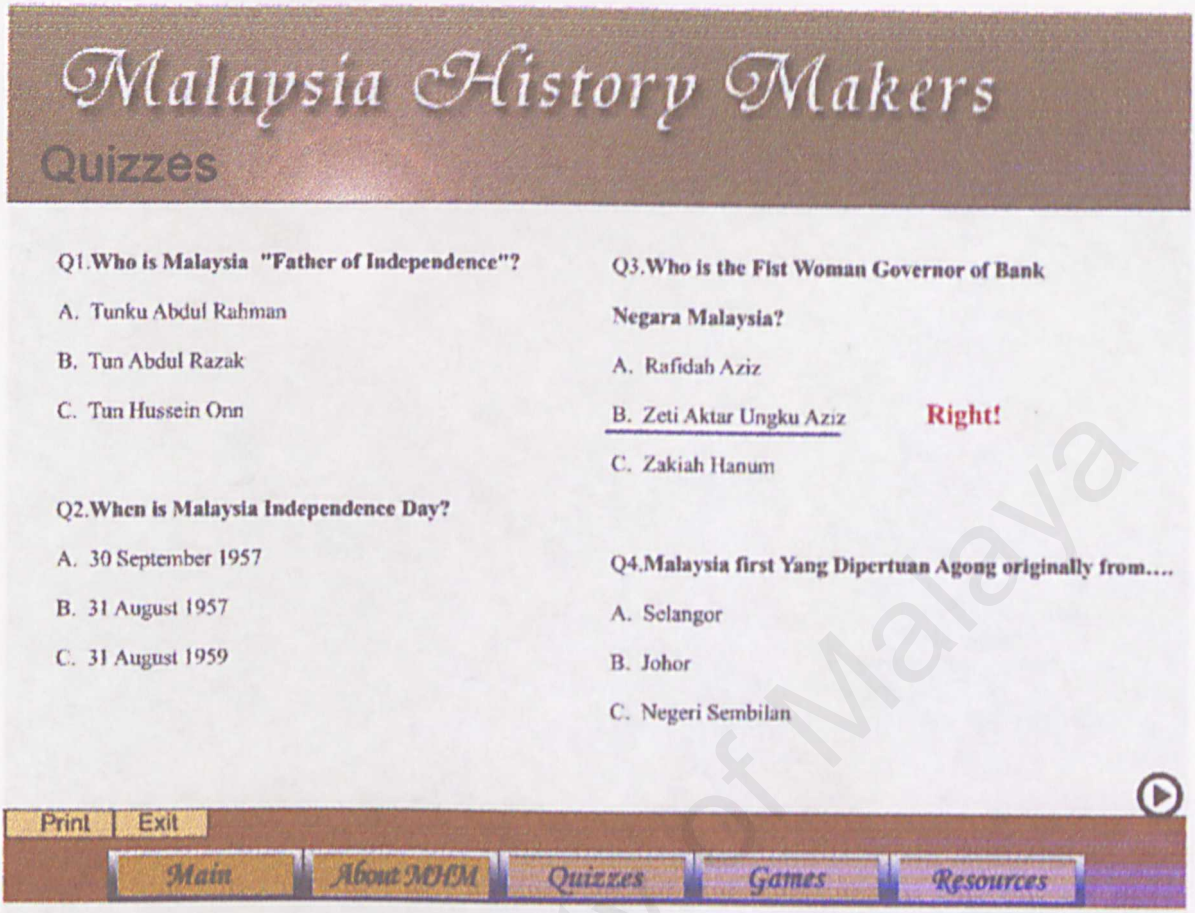


Figure 8.5: *MhM* – quizzes section (checking for answers) about the history makers

This screen appears when you click *Quizzes* button from any part of the software. From this part, each page there are four questions. Users may go to the next page for the rest of the questions provided. To answer the question, drag your mouse to the answer text, then right click your preferred answer. For example, when answering Q3, the most accurate answer is *Zeti Aktar Ungku Aziz*. If the user select this answer, " **Right !** " statement will appear. If not, " **Wrong !** " statement will appear From here, user may also exit from the software and print the selected page.

Figure 8.6: *MhM* – games section in *MhM*

This screen appears when you click *Games* button from any part of the software. An audio command will follow in order to let user know what they have to do. From this part, users may solve the crossword puzzle provided. Just drag and click your mouse to target box to insert each alphabet in each box. The right part of the page is the "legend" or clues for each word. Users may go to the next page for the rest of the questions provided. From here, user may also exit from the software and print the selected page.

Figure 8.7: *MhM* – games section (full solutions) in *MhM*

This screen appears when you click *Games* button from any part of the software. From this part, users may solve the crossword puzzle provided. After completing the crossword puzzle, click to the " **Answer** " button. The full solutions for this crossword puzzle will appear. To solve the puzzle again, click " **Try Again** " button and it will clear up all the solutions for another try. Users may go to the next page for the rest of the questions provided. From here, user may also exit from the software and print the selected page.

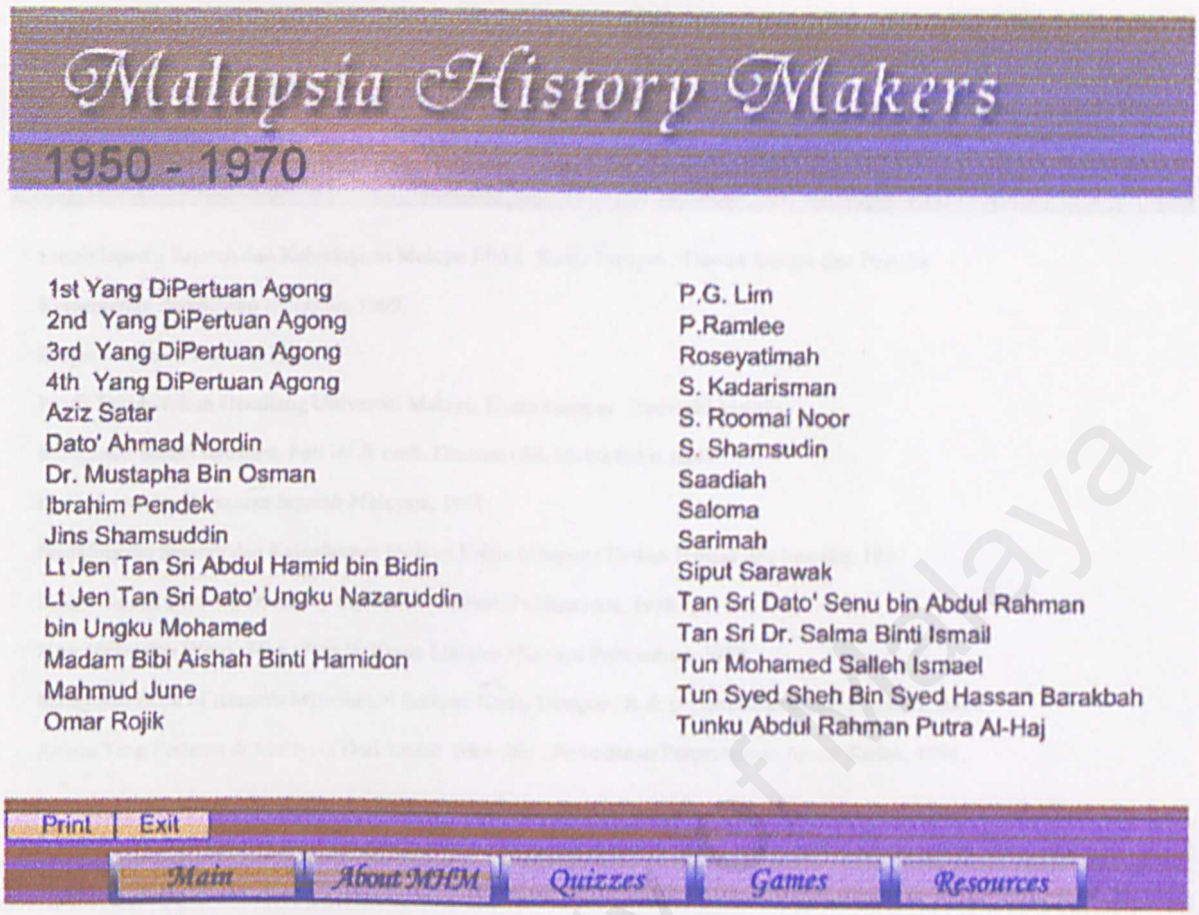


Figure 8.8: *MhM* –list out the history makers in selected range in years

This screen appears when you click *1950-1970* button from the software main page. From this part, lists of history makers within that range of time will appear. User may also click *1970-1990* and *1990-2003* button from the software main page. This will show you the lists of history makers within that range of time. From here, user may also exit from the software and print the selected page.

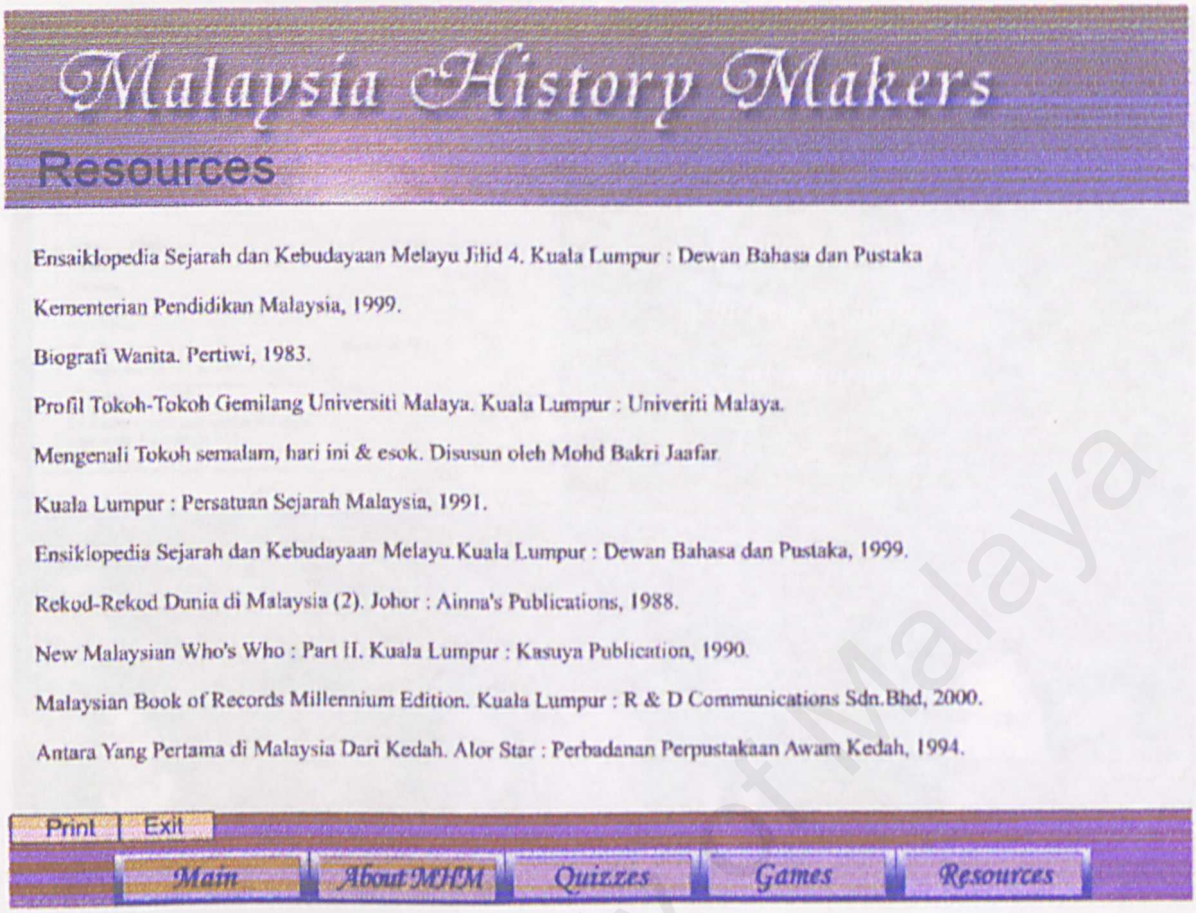


Figure 8.9: *MhM* –list out the history makers authorized resources where the information was retrieved

This screen appears when you click *Resources* button from any part of the software. An audio command will follow in order to let user know what this part is all about. From this part, it will show you the lists of the authorized resources where the information was retrieved. From here, user may also exit from the software and print the selected page.

Figure 8.10: MhM – pop up window for print function

Whenever user in a need to print the software contents of parts that they preferred, just click " **Print** " button that exist within each part of the software. The pop-up window will appear for that purpose. Users have to complete the print function properties and click print to start printing. Most of all, user may exit from using the software anytime the prefer by clicking " **Exit** " button within the software.